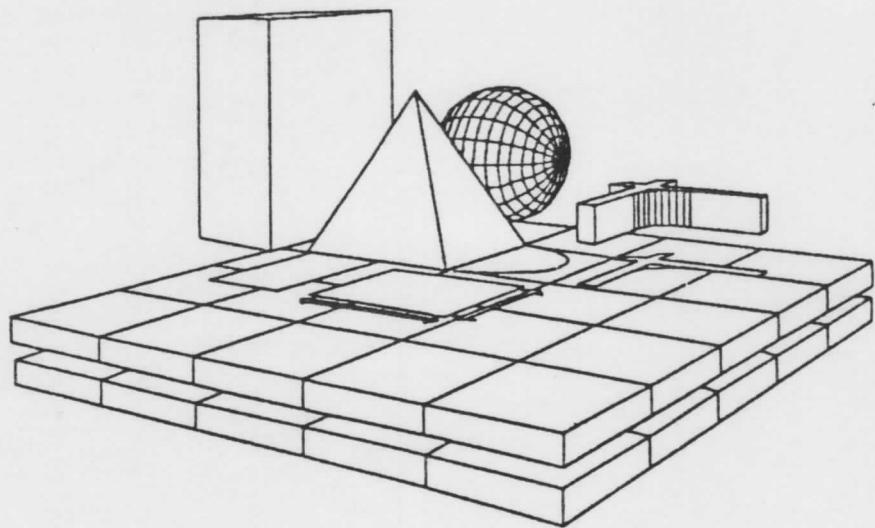


MiniCad+ 3.0



*User's
Guide*

Overview

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MiniCad+ 3.0

Notes and Acknowledgements

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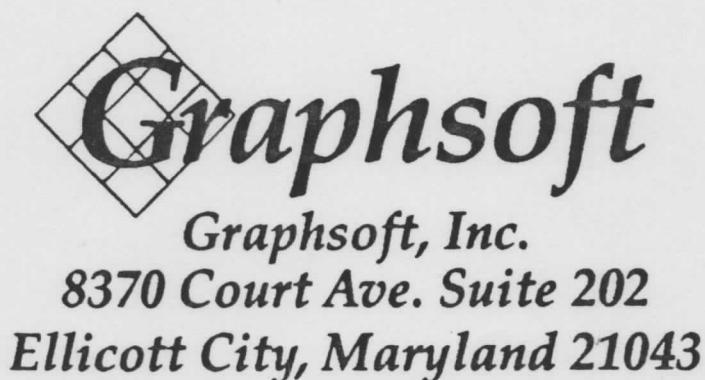
Documentation, illustrations, design and layout are by Joseph DiPaula. Contributing Editors are Richard Diehl, Sean Flaherty, Chris Nebel, Diane Reynolds, David Rock and Kim Rock.

This manual was designed, written and illustrated in house with Aldus's PageMaker 3.0 with screens created through DeskPaint by Zedcor.

We wish to thank all the unnamed engineers, graphic artists, architects, and software engineers whose combined efforts have made MiniCad+ the advanced product it is today. This manual is dedicated to them.

Small portions of this manual may be quoted for review purposes.

All users of MiniCad+ are invited to write us with suggestions and comments regarding possible features for, and uses of, MiniCad+ as well as with any idiosyncrasies they encounter in their use of the program or any inconsistencies between the program's performance and the documentation. Diehl Graphsoft also solicits articles, comments, ideas, drawings and letters for its MiniCad+ user group newsletter. Write:



Warranty, User Registration, and Updates

The MiniCad+ master disks are warranted subject to the conditions of the License Agreement for a period of 6 months from the date of purchase by the end user. The user must return to Diehl Graphsoft a completed copy of the registration form included with this documentation to obtain official registration.

Defective master disks are replaced free of charge to the end user for 6 months after purchase; thereafter master disks will be replaced for a nominal service fee set by Diehl Graphsoft, Inc.

Diehl Graphsoft shall make available from time to time upgrades to the purchased program for nominal charges. Such upgrades, along with the original master copy of the program, shall be considered one program, subject in its entirety to the License Agreement.

MiniCad+ 3.0 Program Requirements and Installation

MiniCad+ 3.0 requires a minimum two megs of memory and a Hard Drive. The program is supplied on two 800K disks and will run on any Macintosh with the above configuration. We recommend that it be used with Apple system version (6.0.2 or higher).

An Installer application on Program Disk 1 will combine the two sections of the program on Program Disk 1 and Program Disk 2 on your Hard Drive.

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Getting Started

This manual is a description of all tools and how they may be used. We suggest that all users start with the tutorial to get the feel of the program first.

The tutorial is broken down into sections with a file on the Tutorial disk representing the completion of each section. If you wish to work in one section or another then open the file with the previous section's title and start from that point.

Each file on the Tutorial Disk was 'Saved As a Template' and will open with the name 'Untitled' thus the original file can not be altered unless you save the template with the same name as the original.

The tutorial will show the user that a program as comprehensive as MiniCad+ 3.0 is easy to use and understand.

The Program

Basically allows:

- Creation of objects in 2D
- Name and Classify objects
- Format and Assign records to objects
- Create Worksheets that search the drawing for data
- Model 3D wireframes from 2D objects

Methods of Drawing

There are four basic ways of drawing:

- With the mouse
- With the mouse and Keyboard entry of data
- 'Create' Dialog Boxes
- Digitizing tablets using any of the above

The tutorial takes you through drawing with the first three methods above.

Smart Cursor

- Indicates type of selection by cursor change.
- Describes snap points on screen when Screen Hints option is active.
- Allows setting precise offsets from cursor snap, Datum, when Floating Datum is active.

Floating Palettes

There are five types of floating palettes in the program:

- Drawing Tools Palette 1
- Constraint Tools Palette 1
- Data Palette 1
- Worksheet Palettes Unlimited
- Command Palettes Unlimited

The users may make as many Worksheet and Command palettes as they wish giving each one a different name.

Initial Setup

When first creating a file:

- Page Setup File menu
- Drawing Size Page menu
- Units Page menu
- Scale Page menu
- Set Grid Page menu

Though any of the above may be changed at any time without causing any problems with the file, it is usually a good practice to set these at the beginning.

Files may be saved as Templates which contain all these settings. See Save as Template in File menu chapter.

Menu Options

Pressing down the Option or Shift key will change the name of some of the menu items. These changes are shown on the cover to each menu section of this manual.

Preferences

This dialog box opened by selecting Preferences in the Δ menu allows the user to preset several options that have a major effect on the drawing process. As an example:

Click-click Drawing

Normally drawing is done by pressing down on the mouse button and dragging the mouse with the button depressed. Deselecting Click-drag in the Preferences menu dialog box allows the user to click and release the mouse button to set the points of objects without having to keep the mouse button depressed while drawing.

Screen Redraw

The screen will redraw when any change has been made to the drawing. To stop redraw, hold down the Command key and type (.).

3D Drawings

Created from 2D objects with menu options found in the Δ menu. Most 2D commands and menus items will work with 3D objects.

Program Defaults

- | | |
|---------------------------|---|
| • Units Name: | Feet & Inches |
| • Units Mark: | " |
| • Units/Inch: | 1.00000e+0 |
| • Resolution: | 1/4096 |
| • Display Accuracy: | 1/4" |
| • Minimum Display Unit | |
| • Standard Units: | On |
| • Format: | English |
| • Angular Accuracy: | Fractional Feet & Inches |
| • Line: | 0° |
| • Fill pattern: | One pixel, no end markers, dimension disabled, solid style, black |
| • Printer Resolution | White |
| • Page setup: | Printer Dependent |
| • Snap to Grid: | U.S. Letter, portrait orientation, no options selected |
| • Snap to Objects: | On |
| • Snap to Locus: | On |
| • Layer Options | Off |
| • Layer name: | Gray Others |
| • Pen Grid: | Untitled |
| • Reference Grid: | 1/8" |
| • Double Line separation: | 1/4" |
| • Origin: | 1/4" |
| • Witness Lines: | Center of page |
| • Text: | On |
| • Markers: | Geneva, 12 point, Plain, Left Justify, Single Space |
| | 12 point |

- Preferences:

—	Rounded Rectangles	Proportional
—	Auto-Rotate Dimension Text	On
—	Dimension Offset	0
—	Constrain Angle	0°
—	Snap Radius	10 pixels
—	Conversion Res	36 seg/circle
—	Offset Duplications	On
—	Click-Drag mode	On
—	Full Screen cursor	Off
—	Screen Hints	On
—	Floating Datum	On

- Color:

—	Fill Foreground	Black
—	Fill Background	White
—	Pen Foreground	Black
—	Pen Background	White
—	Use Layer Colors	Off

Drawing & Constraint Tools

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3.2		Selection Pointer
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3.36		Constrain Tangent

Smart Cursor

- 3.26 Selection Cursors
- 3.28 Drawing Cursors
- 3.28 Screen Hints
- 3.28 Datum
- 3.28 Floating Datum

Introduction

Floating Palettes

The Drawing Tools Palette and the Constraint Tools Palette are both floating palettes. They may be moved around the desktop. They may be closed (removed) by clicking on the Close box in the upper left corner of the palette; reopened by selecting the palette name in Page menu.

Key Equivalents

The Palette icons may be selected for use with the mouse or by typing a Key Equivalent. Once selected, the palette icon will blacken (become highlighted). Some icons remain selected for continual use.

Multiple Choice Icons

Tools with small Arrow icons indicate that they will pop-out with multiple choices of operation. Sliding the cursor across the pop-up with the mouse button still depressed will enable selection of any icon in the pop-up.

When an icon is selected from the multiple choice pop-up, it will take the place of the original icon in the palette. It will remain in the palette for selection until another is chosen from the pop-up to replace it. Key Equivalents will select the current tool icon.

Additional Modes

Double-clicking on some of the icons or typing their keyboard equivalent twice in rapid succession will invoke yet another mode of operation depending upon whether it is a drawing or constraint icon.

Data Display Bar

Some of the drawing tools allow the user to input data while in a drawing mode. This is done through the keyboard, using the Tab key to scroll across the Data Display Bar at the bottom of the screen.

Click-Drag Drawing

The normal drawing mode is to click on the drawing screen with a drawing cursor and drag the mouse to create an object. Releasing the mouse sets the end of the object.

Click-Click Drawing

This method of drawing may be changed to a Click-Click mode by unchecking the Click-Drag button in Δ: Preferences menu. It is not necessary to hold down the mouse button while moving the mouse to create objects if you are using the Click-Click mode.

Pan



Z
Key Equivalent

With this tool selected, the cursor, when moved into the drawing window, will change to an Open Hand cursor. Press down on the mouse button and drag the mouse to move the drawing around the screen.

Once the Pan tool is selected, it remains selected until the user selects another tool. This tool is useful for moving the drawing in small increments on the screen

The Key Equivalent to activate the tool is the letter Z.

An alternate method of moving around the drawing is the use of the Arrow keys. For each time an Arrow key is depressed, the drawing will move one half of the screen in the direction of the arrow. The arrow keys are disengaged when Text or the Worksheet is actively in use.

Double-clicking on the Pan icon will cause a screen redraw.

Selection Pointer

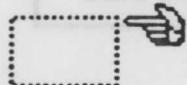


X
Key Equivalent

The Selection Pointer is used to select the palette icons, menu items, and items in the drawing area.

- Any cursor when moved into a Palette or Menu area will change to the Arrow cursor indicating a selection may take place.
- In the drawing area the Selection pointer indicates that the cursor is not actively engaged with any object.
- Multiple selection of objects is done by:
 1. Hold down on the mouse button while dragging the Arrow cursor diagonally across the screen, creating a Marquee (blinking dashed box) around the objects to be selected. Note that the Arrow cursor changes to a Pointing Hand cursor. The Arrow cursor will change to the Pointing Hand cursor if there is no object to select in the drawing area.
 2. Holding down the Option key while creating a Marquee will select any object intersecting the Marquee.

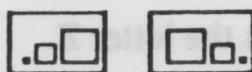
Marquee with
Pointing Hand Cursor



3. Multiple selection may also be done by holding down the Shift key while clicking on objects with the Hollow Arrow cursor. See **Hollow Arrow Cursor** in Smart Cursor; Preferences section.

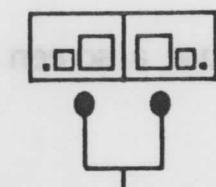
Zoom

In / Out



C V
Key Equivalents

Select either Zoom icon or its key equivalent (C or V). The cursor, when moved into the drawing window, will change into the Cross cursor. Position the cursor at the upper left-hand corner of the area to be zoomed. Hold down the mouse button and drag the cursor diagonally to create a marquee (blinking box) around the area to be enlarged or reduced. Releasing the mouse completes the operation. The factor of zoom is proportional to the area selected and the drawing window.



Double clicking on either zoom icon will zoom by a factor of two.

Cross Cursor

Double-clicking either zoom icon or typing its key equivalent twice will zoom at a factor of two.

Additionally, the Command and Option/Command functions below also allow controlled zooms.

(⌘ 1)	Command '1' Enlarges 2 times	Option/Command '1' halves the size
(⌘ 2)	Command '2' Enlarges 4 times	Option/Command '2' Quarters the size

Any objects that are selected when Key Equivalents or Commands are used to zoom, will be centered in the new drawing window when the screen redraws.

Text



3

Key Equivalent

I

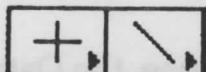
I-Beam Cursor

Select the Text icon. Moving the cursor to the drawing window will change the Arrow cursor to an I-Beam cursor. Click on the screen and the I-Beam cursor blinks to indicate the current position of text entry.

Move the mouse and you will note that the I-Beam cursor remains at the position it was placed while the Arrow cursor moves with the mouse. Click the Arrow cursor on the screen and the I-Beam will move to where the Arrow cursor was clicked, setting a new entry point for text. Editing and deleting of text is done with the I-Beam cursor similar to text programs.

Each time the Arrow cursor is used to set a new text entry, a text block is created. Each text block may have a different Font, Size or Style. Text characteristics are set or changed with the Text menu items. See the Text chapter in this manual.

LINES



Constrained Lines



1

Key Equivalent

These two icons are for creating lines. The small arrows indicate that holding down the mouse button while the icon is selected will bring up a multiple choice icon bar.

These icons represent (from left to right):

- Single Constrained Lines
- Double Constrained Lines
- Constrained Leader Lines

This tool creates lines constrained to 30° , 45° , 90° , or the complements thereof. See Δ :Preferences for setting an additional constraint angle.

These icons represent (from left to right):

- Single Unconstrained Lines
- Double Unconstrained Lines
- Unconstrained Leader Lines

Unconstrained Lines may be drawn at any angle.

Small Cross Cursor

+

The Small Cross cursor is used to draw all the graphic objects: lines, rectangles, rounded rectangles, ovals, circles, quarter arcs, full arcs, freehand lines, and polygons.

Modes of Drawing

Most of the Drawing Tools have three modes of operation:

- Drawing with the mouse only.
- Interfacing with the mouse through keyboard entry.
- Entering data into a dialog box.

Mouse

Select either line tool icon and move to the drawing area. The Small Cross cursor will appear. Press down on the mouse button to set the beginning of the line. With the button held down, move the mouse, dragging the cursor across the screen. Releasing the mouse button will set the endpoint of the line. This is the Click-Drag method of drawing.

Click-Click Mode

If the Click-Drag button in the Δ : Preferences menu item is turned off, the mouse button does not have to be held down while drawing the line. Click the mouse button to set the beginning of the line. Then, move the mouse without holding down on the button and click the mouse button to set the endpoint of the line. This is the Click-Click method of drawing.

Data Display Bar

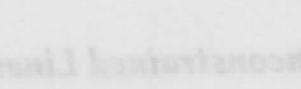
While an object is being drawn with the mouse, the Data Display Bar at the bottom of the screen will change from its normal display to data pertinent to the object being drawn. For lines:

- W: Width of object
- H: Height of object
- L: Length of object
- A: Angle of object
- X: X location of cursor
- Y: Y location of cursor

Small Cross Cursor
The Small Cross cursor is used during
object selection, when using
the mouse to draw lines and shapes.



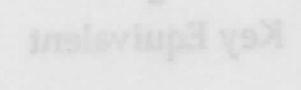
Large Cross Cursor
The Large Cross cursor is used during
object selection, when using
the mouse to draw lines and shapes.



Arrow Cursor
The Arrow cursor is used during
object selection, when using
the mouse to move objects.



Hand Cursor
The Hand cursor is used during
object selection, when using
the mouse to rotate objects.



Size Cursor
The Size cursor is used during
object selection, when using
the mouse to resize objects.



Move Cursor
The Move cursor is used during
object selection, when using
the mouse to move objects.



Mouse and Keyboard Entry

When using the Click-Drag method of drawing with the mouse, the mouse button must remain depressed while entering data in the Data Display Bar.

- Start drawing with the mouse.
- Press the Tab key or click in the data bar to activate the Data Display Bar at the bottom of the screen for keyboard entry.
- Scroll through the Data Display Bar using the Tab or Arrow keys.
- Type the entry and press the Enter key to scroll to the next position in the bar or the the Return key to set the entries.

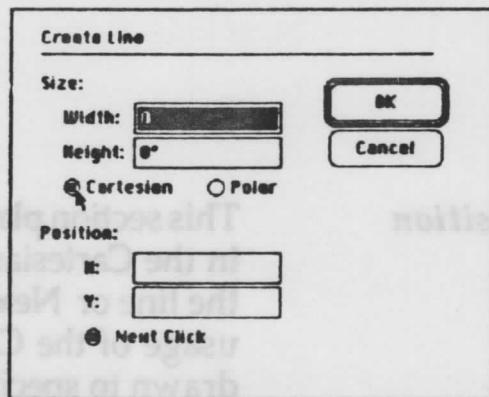
It is easier to input data when using the Click-Click method of drawing. The mouse does not have to be held down after starting to draw an object.

Dialog Box Entry

The third method of drawing is the Create Dialog Box which is accessible from most of the drawing tools. Either clicking twice on the palette icon or typing its Key Equivalent twice in rapid succession will bring up the Create Dialog Box. Lines may be drawn with either Cartesian or Polar dimension data.

The Create Line box has three sections:

- Size
- Position
- OK or Cancel



Size

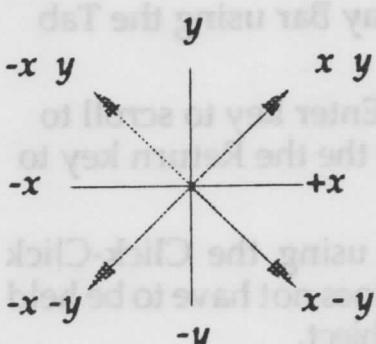
This section is for input of the of Cartesian height and width or Polar length and angle of the line to be created depending upon which button is selected.

The program's default for the Create Dialog is Cartesian with Width and Height data entry boxes. This draws a line by inputting the 'x' and 'y' distance the line will travel to its endpoint. The data creates a line from the 'x,y' Position or mouse placement to the specified height (y value) and width (x value).

Cartesian

Using the center of the intersecting lines below as the position point of the line to be drawn, Cartesian width and height data input needs to be positive or negative depending on the direction the line is being drawn.

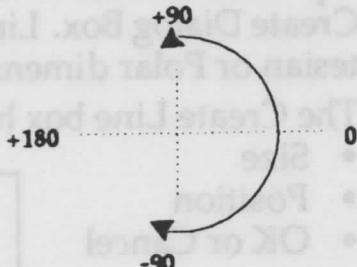
Drawing upward the 'y' data will be positive and downward the 'y' data is negative. (Preceeded by '-'). Drawing to the right 'x' is positive and to the left 'x' is negative.



Polar

width-negative height-positive	width-positive height-positive
width-negative height-negative	width-positive height-negative

Select the Polar button and the input boxes change to Length and Angle. Length is the true length of the line. The Angles used are not Compass degrees. Relative to a compass, 0° angle is due East. Positive degrees are counter-clockwise and negative degrees are clockwise from 0° .



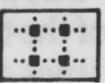
Position

This section places the line on the screen either by typing in the Cartesian screen coordinates of the beginning of the line or Next Click. Using Next Click will also allow usage of the Constraint tools, snapping the line being drawn to specific objects or points of objects.

OK - Cancel

The default of most dialog boxes is in bold type. Hitting the Return key will give the same result as clicking on the default button. Clicking OK or hitting the Return key will either draw the line or beep if the input data can not be accepted by the program. Hitting the Cancel button will take you back to the drawing window with no changes to the drawing.

Double Line Modes



Note: Double clicking the Snap to Grid palette tool will open the Set Grid dialog box where the double line offsets are set (highlighted below).

Both line tools have Double Line modes. To access the Double Line mode, hold down on either Line tool until you see the pop-out icons. Select the Double Line icon. Once the Double Line mode is selected, it becomes the default in the palette and may be accessed by its keyboard equivalent. The distance between double lines is set in the dialog box that appears when selecting Set Grid in the Page menu or double-clicking on the Snap to Grid constraint tool.

Lines are drawn the same as with the Single line mode. However, in the Double line mode there are several additional options:

- Lines, Lines with Fills, or Polygons
- Toggle between drawing with either line, doubling the distance between the lines and drawing with an invisible center line, or doubling the distance between the lines and drawing with a visible center line.
- Toggle a 45° mitre at the ends of the lines to up, down, or off.

Double Line Separation

The choices in the lower section of the Set Grid dialog allow either or both boxes to be checked.

Create Lines:

If only this box is checked then just double lines are created.

Create Polygons:

If only this box is checked then polygons will be created at the set distance. The ends of the polygons will be closed.

Create Lines and Polygons:

When both boxes are checked, double lines will be created which may contain fill patterns.

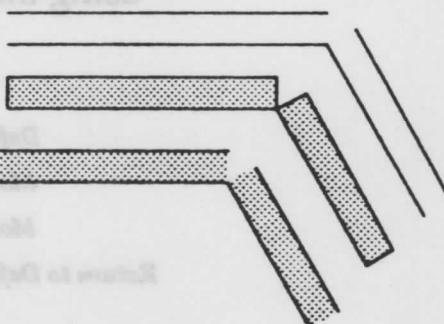
Double Line Separation:

- Create Lines
 Create Polygons

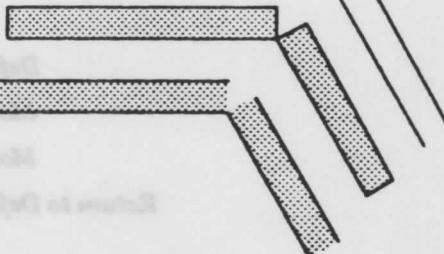
OK

Cancel

Lines Only



Polygons Only



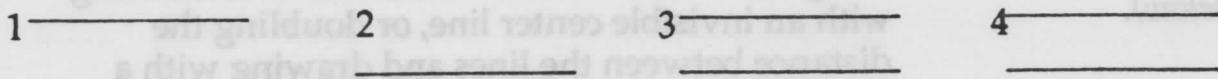
Both Lines and Polygons

Double Line Creation



When drawing with the double line tool, one of the double lines is the line you are drawing with and will snap according to the snap tools set. The other line(s) are drawn at the parallel offset in Set Grid. There are four choices for doubles which are accessible by toggling the Command key while in the process of drawing the lines.

Select the Constrained Double Line icon. Draw a double line horizontally from left to right. The bottom of the two lines is the snapping line. Draw another set of lines and this time hit the Command key once while in the process of drawing. The second set of lines is drawn twice the distance apart as the first set and is drawn by an invisible center line which is also the snapping line.



While drawing a third set of lines, hit the Command key once more and the double lines go back to the original offset being drawn by the top line. Draw a fourth set of lines and hit the Command key once more to cause the double lines to change to three lines being drawn by the center line.

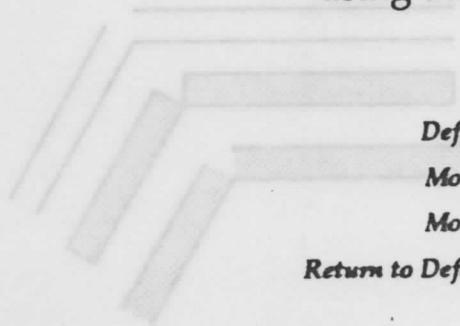
Toggling the Command key once more would complete the cycle and you would be drawing with the bottom line when going from left to right.

Drawing in different directions will change 1 and 3 as to whether it is the top or bottom line or whether it is the left or right line.

If the default Click-Drag mode is toggled Off, it is not necessary to hold down the mouse when toggling between choices of double lines.

Mitre Modes

The Mitre modes work similar to the above modes. They toggle through a series of mitre choices shown below using the Option & Tilde keys.



Option

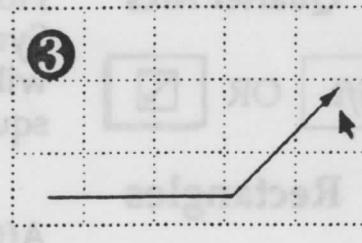
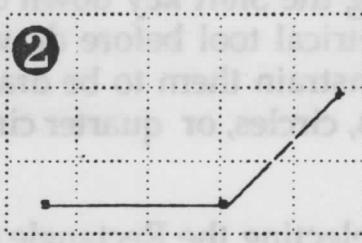
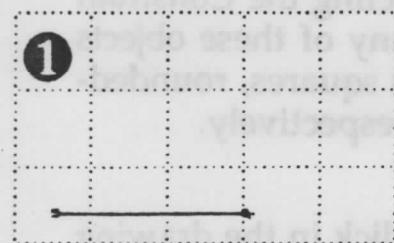
- Default
- Mode 1
- Mode 2
- Return to Default

~

- Default
- Mode 1
- Mode 2
- Return to Default

L^eader Lines

Leader Lines may be selected from either line tool. The only difference is that one will be constrained while the other can be drawn at any angle.



Using the Constrained Line tool:

- 1 The first line segment will be automatically constrained.
- 2 Upon release, a free line begins at the end point of the first line.
- 3 Clicking the mouse gives an end point of the leader line which receives the current line marker upon its release.

Line Attributes

Line Width, Markers, Marker Styles, and Line Styles are selectable from the Lines menu and are explained in that section of this manual.

Moving Lines

Click the Arrow cursor on a line and keep the mouse button depressed. Move the mouse and the line will move accordingly, maintaining its length and angle.

Rescaling Lines

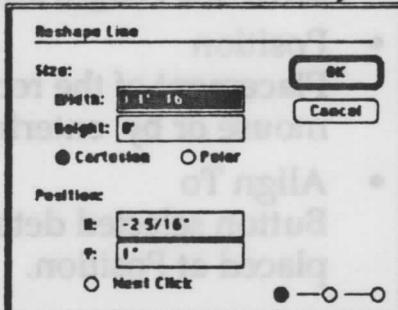
After selecting a line, click on either endpoint and with the mouse still depressed, move the mouse. The endpoint selected will move with the mouse changing its length and angle. The exceptions to this are horizontal or vertical lines.

Reshaping Lines

With a line selected, select Reshape from the Edit menu or hold down the Command key and type R. The only difference between the Reshape and Create dialog boxes is at the bottom right of the box.

⌘ R

The button selected indicates from which point the line was originally created. Selecting one of the other buttons reshapes the line from the newly selected point.

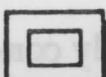


Rectangles
Rounded Rectangles
Circle-Ovals
Quarter Arcs



Shift OR 

Rectangles



4
Key Equivalent

Data Display Bar

After selecting the Rectangle tool, click in the drawing area and with the mouse button held down, drag the cursor in a diagonal direction across the screen. Release the mouse to set the end of the rectangle.

With the Click-Drag mode toggled Off, the mouse button does not have to remain depressed while moving the mouse diagonally to create the rectangle. Click to set the endpoint of the rectangle.

While in the process of drawing, the Data Display Bar will display:

- **W** Width of rectangle from creation point to cursor location.
- **H** Height of rectangle from creation point to cursor location.
- **Ratio** Ratio of Height to Width of Rectangle.
- **A** Angle of cursor from creation point.
- **X** x position of cursor.
- **Y** y position of cursor.

Keyboard Entry

Using the mouse with keyboard entry is accomplished in the same manner as explained previously with Lines.

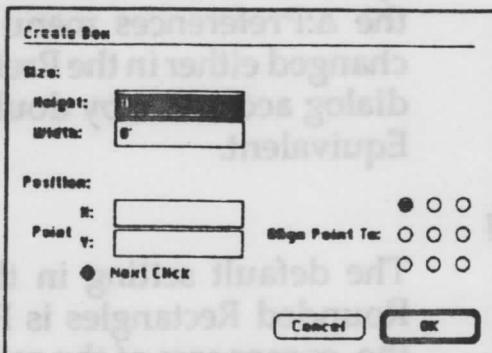
Create Box

Double clicking on the icon or double-striking the keyboard equivalent will bring up the Create Box dialog displayed on the next page. The four sections of this dialog are similar to all Create dialogs.

- **Size**
Enter the Height and Width.
- **Position**
Placement of the rectangle can be done by the mouse or by entering the screen coordinates.
- **Align To**
Button selected determines which point of object is placed at Position.

- **OK - Cancel**

Clicking on the OK button or hitting the Return key will create the object as specified in the data boxes. Cancel will return you to the drawing screen with no changes made.



Selecting Rectangles

Rectangles may be selected by clicking on perimeter lines or by drawing a Marquee around them. If a rectangle has a fill pattern, clicking inside the perimeter will also select it. When a rectangle has a fill pattern, you must click outside of the rectangle to deselect it.

Rescaling Rectangles

Clicking on a rectangle's handle (little boxes indicating the object is selected) and dragging the handle with the mouse button depressed will cause the object to rescale. The corner handles allow rescale in both *x* and *y* direction while the middle handles allow rescale only in an *x* or *y* direction depending upon which one is dragged.

Reshaping Rectangles

⌘ R

With a rectangle selected, select Reshape from the Edit menu or hold down the Command key and type R. The Reshape and Create dialog boxes are identical in design.

Clicking on the Align To buttons will change the Position data to display the current position of that point of the rectangle in the drawing window. If changes are to be made in both the Align To buttons and Position data, make the change to the Align To button first.

Line Weights

The line weight of rectangles can be changed similar to lines. See the Lines menu chapter in this manual.

Area & Perimeter



Caliper Cursor

While one or more object is selected, press and hold down on the Option key. Move the Arrow cursor to one of the selected rectangles' handles and press and hold the mouse button down. The Arrow cursor will change to a Caliper cursor and the Data Display Bar will display Area and Perimeter of the rectangle(s) selected.

Rounded Rectangles



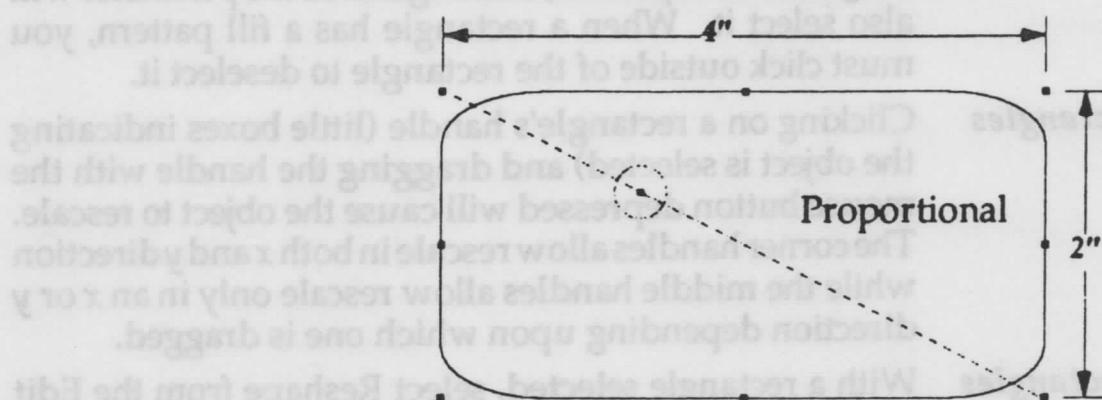
5

Key Equivalent

Drawing and editing Rounded Rectangles is similar to rectangles with the options of having arced corners that are Proportional, Symmetrical, both Proportional and Symmetrical, or neither. These default options are set in the Δ:Preferences menu dialog. The setting may be changed either in the Preferences dialog or in the Create dialog accessible by double-clicking on the icon or Key Equivalent.

Proportional

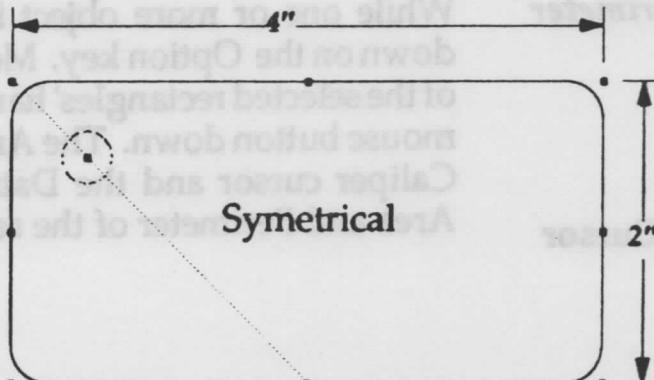
The default setting in the Preferences dialog box for Rounded Rectangles is Proportional. This means that the corner arcs of the rounded rectangle will be drawn proportionally to the length of its sides. The illustration below shows the horizontal arc length, X diameter, is longer than the vertical, Y diameter.



The circled black handle in the above illustration is used to manually reshape the arced corners of the Rounded Rectangle. The data in the display bar will change while reshaping to inform the user of the current arc size.

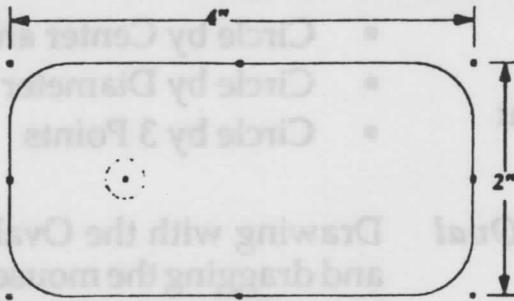
Symmetrical

The Symmetrical Rounded Rectangle below is the same size as the one used for the Proportional but the arced corners are symmetrical (having same height and width).



Proportional and Symmetrical

If both Proportional and Symmetrical are selected, MiniCad+ will adjust the difference of proportional and symmetrical arcs for the corners as illustrated below.

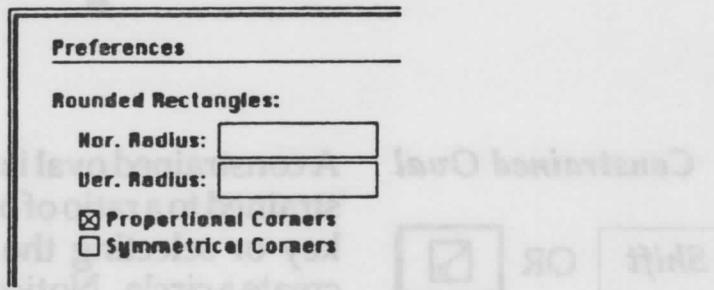


Nonproportional and Nonsymmetrical

Setting Preferences Dialog Box

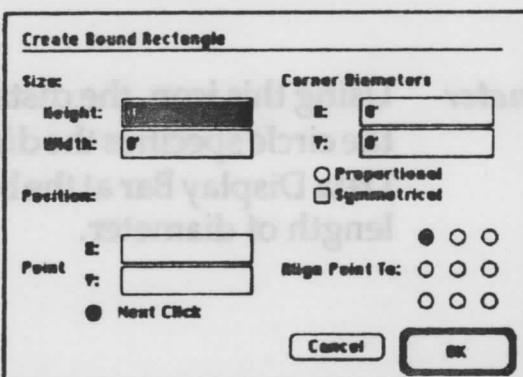
Selecting neither Proportional nor Symmetrical, the user may input any size arced corner for the rounded rectangle.

The left side of the dialog box is for Rounded Rectangle preferences. The Proportional button is defaulted ON. Any changes here must be done by clicking the buttons to turn them ON or OFF.



Create Rounded Rectangle

After Preferences have been set, it is not necessary to change them when wanting to create a Rounded Rectangle different from those settings. Clicking twice on the highlighted Rounded Rectangle tool icon will bring up a data entry box as shown below. Any rounded rectangle created here will take precedence over the choices in the Preferences box.



Oval/Circle



6

Key Equivalent

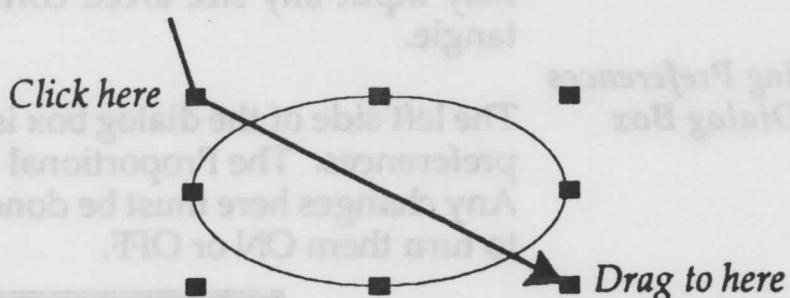
The four pop-out choices for this tool are:

- Oval
- Circle by Center and Radius
- Circle by Diameter
- Circle by 3 Points

Oval



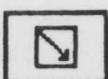
Drawing with the Oval/Circle tool is done by clicking and dragging the mouse across the screen. Using the Tab key will allow keyboard entry into the Data Display Bar. The ratio in the Data Display Bar indicates the ratio of Y to X.



Constrained Oval

Shift

OR



A constrained oval is one whose height and width is constrained to a ratio of one, a circle. Holding down the Shift key or selecting the Constrain Symmetrical icon, will create a circle. Notice how both the oval and constrained oval move away from the initial drawing point.

Circle by Radius



Selecting the icon with a dot in the center will allow creation of circles by radius (Center point). Click and drag in any direction. The L: in the Data Display Bar at the bottom of the screen indicates the length of radius.

Circles by Diameter



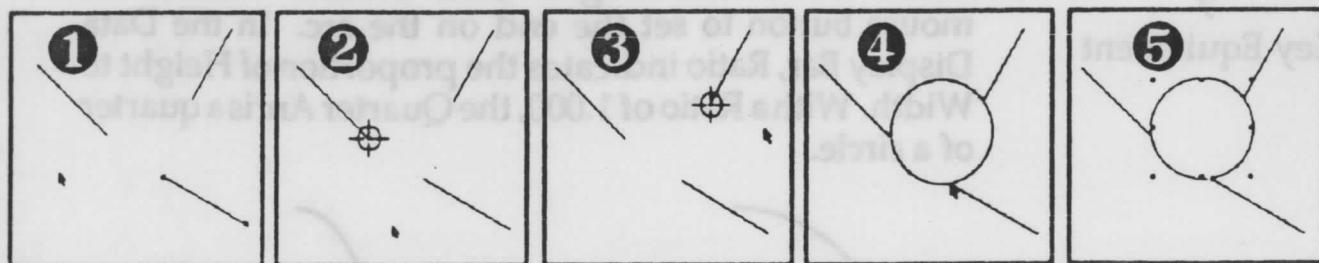
Using this icon, the distance between the clicks to create the circle specifies the diameter of the circle. The L: in the Data Display Bar at the bottom of the screen indicates the length of diameter.

Circle by 3 points



The cursor will change to a Bullseye cursor to set the three points of the circle. It makes no difference which endpoint is snapped to first.

Example:

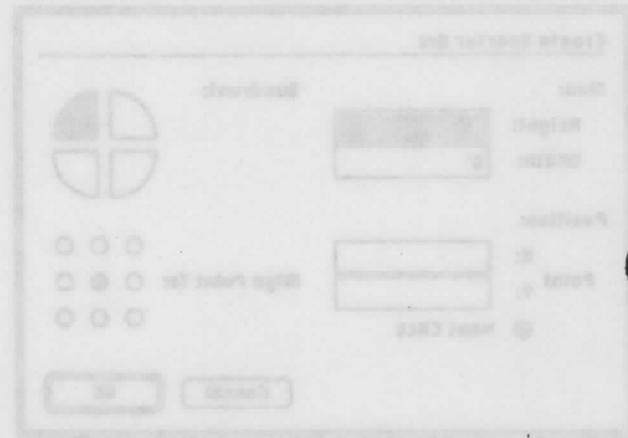
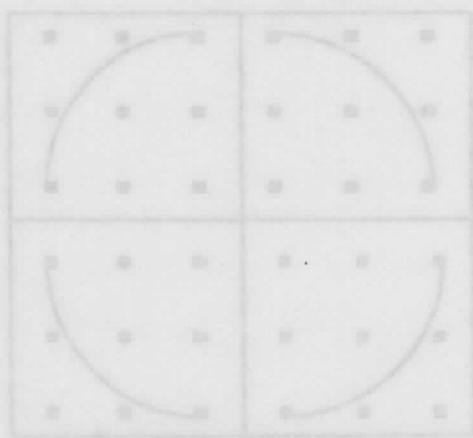
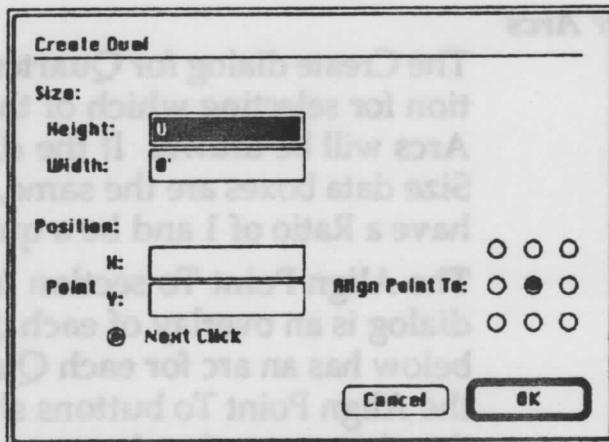


Data Display Bar

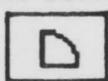
- L
Displays distance from point 1 to 2 or point 2 to 3
- A
Displays angle from point 1 to 2 or point 2 to 3.

Create Oval

The Create Oval dialog accessible by double-clicking on the icon or Key Equivalent works similar to the Create Box dialog .



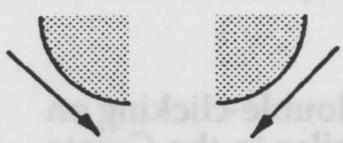
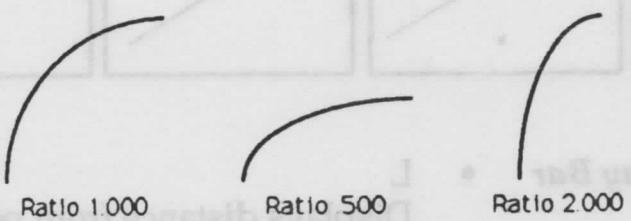
Quarter Arc



7

Key Equivalent

This tool creates arcs of 90°. Using the Click-Drag mode, click to set the beginning of the arc. Hold down the mouse button and drag to draw the arc. Release the mouse button to set the end on the arc. In the Data Display Bar, Ratio indicates the proportion of Height to Width. With a Ratio of 1.000, the Quarter Arc is a quarter of a circle.

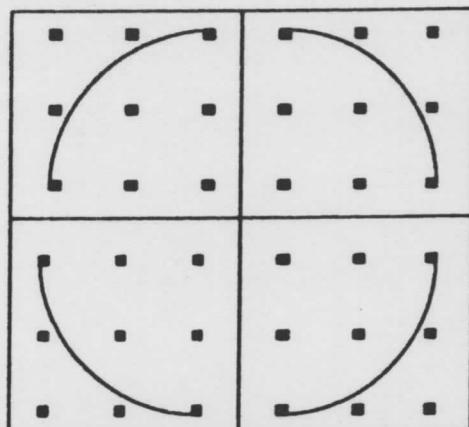
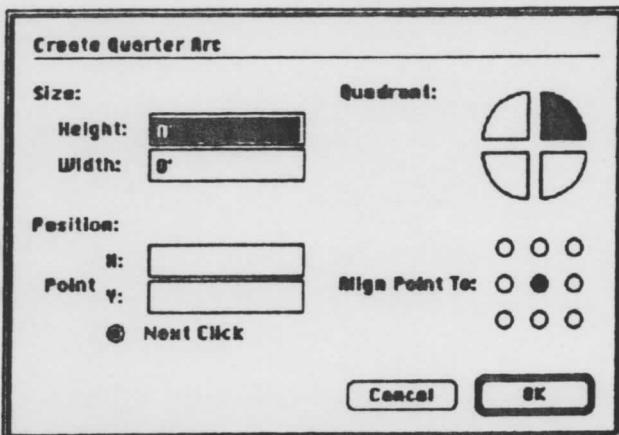


Since a Quarter Arc is always 90°, it is one quarter of an oval or circle. The direction the cursor is dragged while drawing determines which quadrant of the oval or circle is created.

Create Quarter Arcs

The Create dialog for Quarter Arcs has a Quadrant section for selecting which of the four choices of Quarter-Arcs will be drawn. If the dimensions placed into the Size data boxes are the same, then the Quarter Arc will have a Ratio of 1 and be a quarter of a circle.

The Align Point To section for the Create Quarter Arc dialog is an overlay of each quadrant. The illustration below has an arc for each Quadrant with an overlay of the Align Point To buttons showing how they relate to the placement of each arc.



Full Arcs



This tool draws circular arcs of any degree at any angle. There are five multiple choice icons for drawing full arcs selectable by mouse or keyboard equivalent:

8

Key Equivalent



- Arc by Radius



- Arc by 3 points



- Arc Tangent to Line



- Arc by 2 Points and Center



- Arc by 2 Points with Specified Radius.

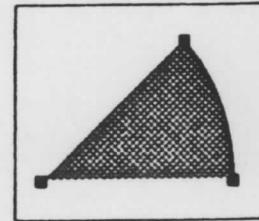
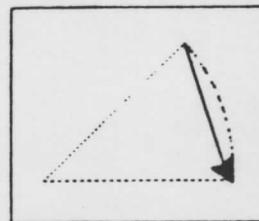
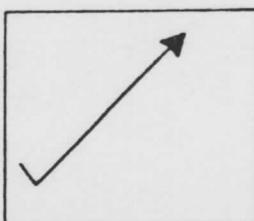
Arc by Radius



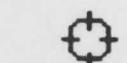
Using the Click-Drag method, click and drag the mouse to draw the radius line. When the radius line is the proper length, release the mouse button and draw the arc by moving the mouse. Click the mouse button to complete the arc.

The Data Display Bar has two functions when drawing an arc by its radius. First, when drawing the radius line, it displays the attributes of the line (Width, Height, Length, Angle, and the x and y location of the cursor. When the mouse is released to start drawing the arc sweep, the Data Display Bar then changes to:

- Start A
Most clockwise angle of the arc. When drawing an arc counter-clockwise, this angle will not change because it is the most clockwise angle.
- Arc A
Degrees of angle in arc.
- L
Cursor distance from arc vertex.
- A
Cursor angle from arc vertex
- X & Y
Cursor location on screen.



Arc by 3 Points



Bullseye cursor

This tool creates arcs by clicking 3 times in the drawing area. The cursor changes to a Bullseye cursor indicating that the program is waiting for you to click in the drawing area. The first click defines the starting point of the arc, and the 3rd click defines the ending point of the arc. Using Snap to Objects or Snap to Intersection will guarantee that the bullseye is snapping to the point wanted.

Arc Tangent to a Line



Small Cross Cursor

This tool uses the Small Cross cursor. Click the mouse when the cursor is at the point of a line you wish to be tangent to. Holding down on the mouse button, drag the mouse so the cursor moves to another point of the same line. Release the mouse button and move the cursor to the endpoint of the arc. Click the mouse button to set the arc.

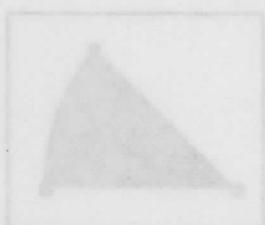
Using Snap to Surface will insure that the first two clicks are on the line the arc is being drawn tangent to.

Arc by 2 Points and Center

This tool uses the Bullseye cursor to set the length of the arc and Arrow cursor to set the radius. Click and release with the Bullseye cursor to set the beginning point of the arc. Move the cursor and click the mouse to set the endpoint of the arc but do not release the mouse button. After clicking the endpoint, the cursor changes to the Arrow cursor. With the mouse button still held down, move the cursor to set the radius of the arc.

Arc by 2 Points and Specified Radius

With this tool the user defines the beginning of the arc by clicking once to set the beginning point, then clicks the mouse to set the end point of the arc. A data box will present itself for entry of the radius. This databox also displays the minimum radius that may be set for the arc.

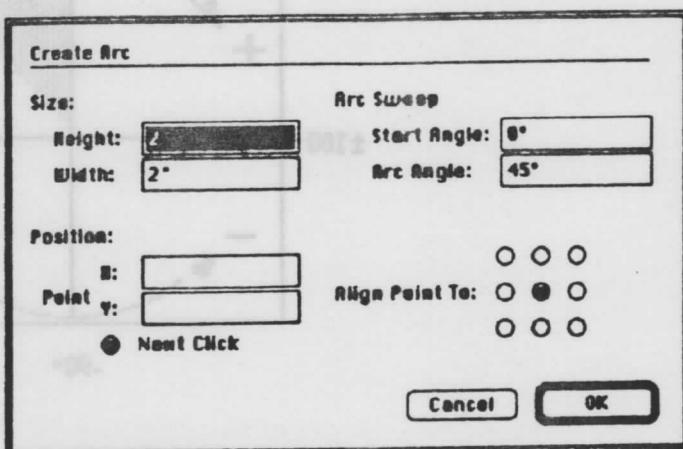


Create Full Arcs



Clicking twice on any Full Arc icon or striking its Key Equivalent twice opens the Create dialog box.

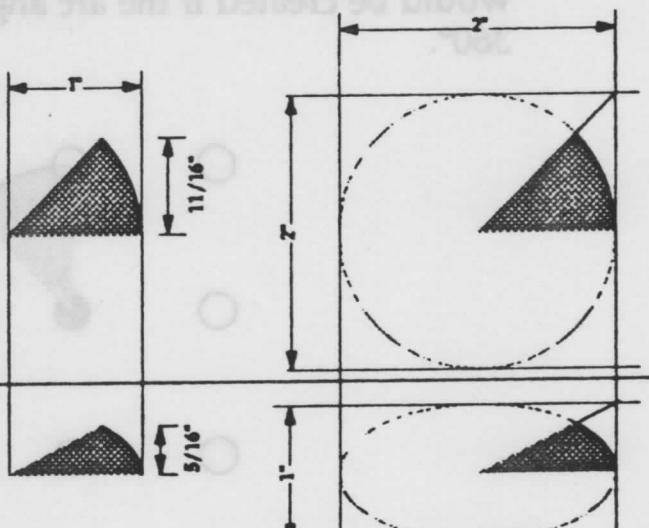
The main advantage of drawing through the Full Arc dialog box is that it allows the creation of elliptical arcs. The Size data (Height and Width) is the size of the circle or oval from which the arc is cut. Position data is similar to that feature in other data entry boxes. Arc Sweep controls the starting angle of the arc and length of arc angle. It also determines the direction of sweep depending on whether positive or negative degrees are entered. Alignment places a particular part of the arc at the position coordinates or point of mouse click.



The first illustration below shows the arc being cut from a circle with the specifications listed above. The second illustration shows what happens when the height is one half the width.

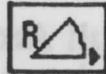
Settings: Top illustration

Height: 2"
Width: 2"
Start Angle: 0°
Arc Angle: 45°

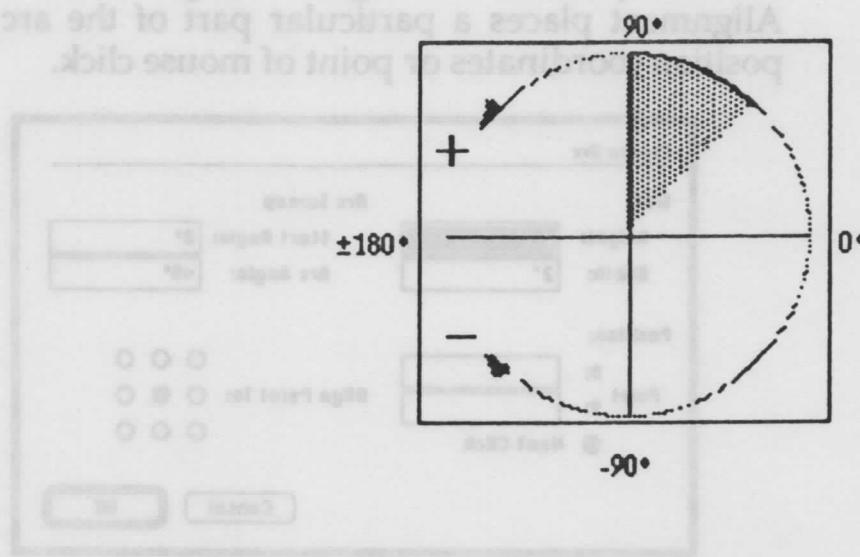


Settings: Bottom illustration

Change → Height: 1"
Width: 2"
Start Angle: 0°
Arc Angle: 45°

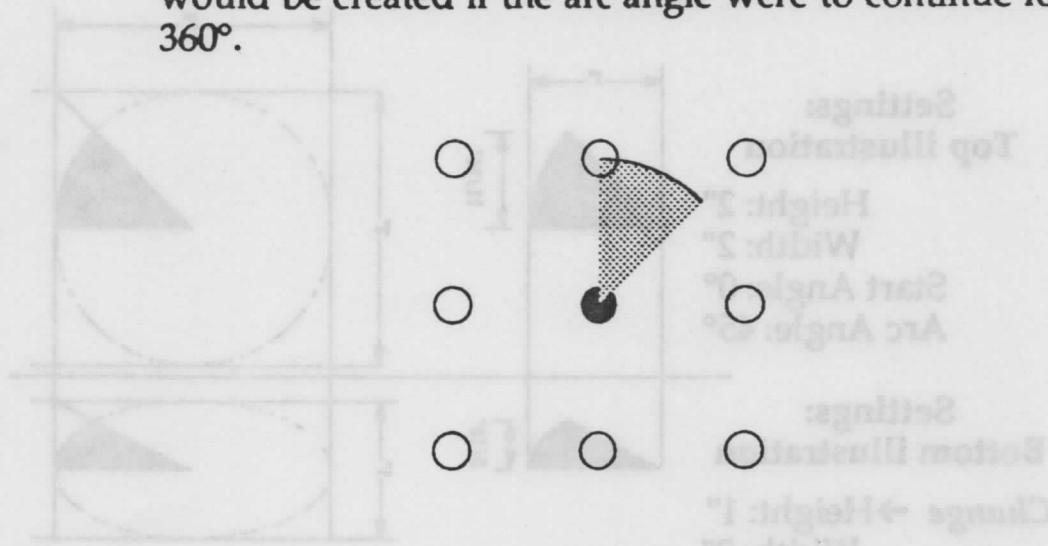


Arc Sweep in the Create Arc dialog box is somewhat different from the Quadrant portion of the Quarter Arc dialog box. Start Angle indicates the segment of the 360° oval from which you start the arc. 0° equals due East. Arc Angle is the measurement of the arc itself. Positive degrees run counter-clockwise and negative degrees run clockwise. The illustration below was done with a 90° Start Angle and a -45° Arc Angle. This put the starting point at 90° and swept the angle 45° clockwise.

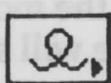


Align Point To

Placement of full arcs is also different than with quarter arcs. Here 'Align Point To:' is not an overlay of each arc quadrant but an overlay of the entire oval or circle that would be created if the arc angle were to continue for 360°.



Freehand

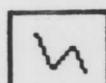


9

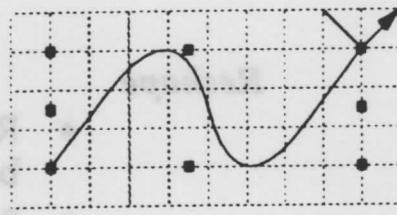
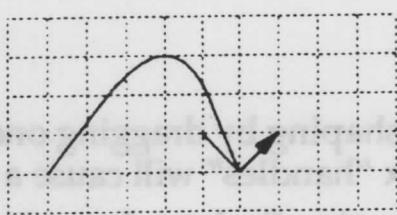
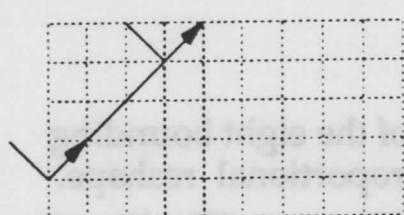
Key Equivalent

There are two choices with this pop-out icon. The first, known as the Freehand Tool, produces a polygon that follows the cursor path while the mouse is being dragged. The number of vertices placed depends on the curvature of the polygon being drawn. Once created, it may be reshaped or edited as any other polygon. See Polygons on the following pages.

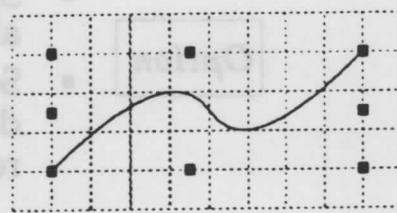
Cubic Spline



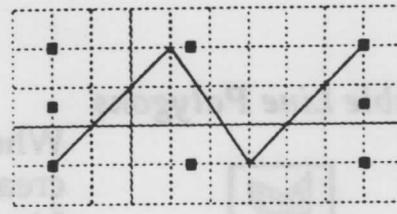
Drawing with the Cubic Spline icon creates a spline that passes through points. The first two clicks of the mouse represent a straight line. No curve is created until the cursor passes the second point. Once Cubic splines have been created, they may be changed to Bezier curves or a regular polygon by choosing the Edit:Smoothing menu item. They may be reshaped or edited as any other polygon.



This is the result you would get if you chose Bezier under Edit: Smoothing.



This is the result you would get if you chose None under Edit:Smoothing.



With Get Only Selected Box Set To
• Create Lines Only Create Joints Only Create Polygons
• Smoothly Join All Intersections



Polygons



Keyboard Equivalent
0

There is no difference between Click-Drag defaulted On or Off when drawing a polygon. It is not necessary to hold down the mouse button when moving the mouse from point to point. Each click of the mouse will set a new vertex (corner) of the polygon. Clicking on the beginning vertex point a second time or double-clicking at any point will complete the polygon. Polygons may have 4000 vertices.

The three choices of the Polygon tool are:



- Polygons
- Double Line Polygons
- 3D Polygons.

Shift

OR



Depressing the Shift key or selecting the Constrain Angle tool while drawing a polygon will constrain the angles of the polygon's sides.

Reshape

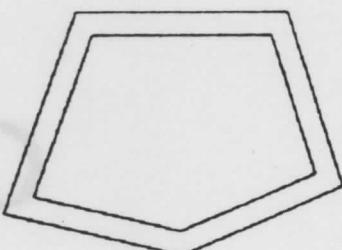
Option

- Reshaping by dragging one of the eight bounding box "handles" will cause a proportional reshape.
- Selecting Reshape from the Edit menu (⌘ - R) will allow reshaping of each vertex individually;
- Selecting Reshape from the Edit menu while depressing the Option key will allow Data Box reshaping of the polygon vertex by vertex.

Double Line Polygons



When this icon is selected, double line polygons are created with the parameters set in Set Grid for Double Lines.



With Set Grid dialog box set to:

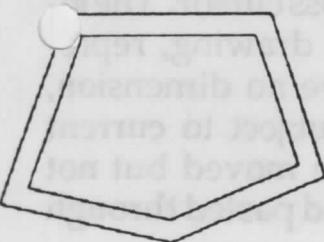
- Create Lines only creates double lines that automatically Join all intersections.

Double Line Separation:

Create Lines

Create Polygons

4

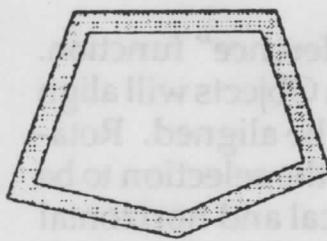


- Selecting Create Polygons only creates a double line polygon with the last intersection mitred.

Double Line Separation:

Create Lines
 Create Polygons

4"



- With both boxes selected, the tool creates double lines that are joined at all intersections with polygon fill.

Double Line Separation:

Create Lines
 Create Polygons

4"

Create Polygons

Clicking twice on the Polygon tool will bring up a data entry box for drawing a polygon.

Next / Prev

These buttons select which vertex of the polygon will be edited. Each click in either of these two boxes will change the number in the Vertex No. box.

Add / Remove

These two buttons will either add or remove a vertex to or from the polygon that is being created or edited. A vertex will be added before the current vertex if Add is chosen. The current vertex will be removed if Remove is chosen.

Vertex No.

This tells which vertex is currently displayed. The first point created is number one.

Total No.

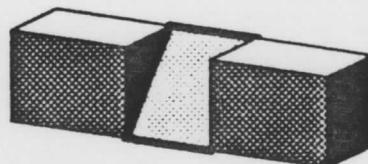
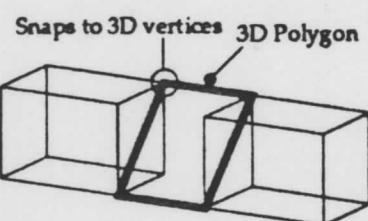
This is the total number of vertices or points in the currently selected polygon.

Close Polygon

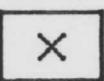
If this box is active when the OK button is clicked, the first and last vertices of the entered polygon will automatically be connected.

3D Polygons

Creates a zero depth 3D polygon unless snapped to the points of 3D objects of different depths.



Locus



Key Equivalent



Large Cross Cursor

The cursor used for loci is the Large Cross cursor. The locus (plural loci) places points on the drawing, represented by a diagonal cross. Loci have no dimension, only location. Locus placement is subject to current cursor snap modes. A locus may be moved but not reshaped. Loci may be cut or copied and pasted through the Clipboard within the program.

The locus has primarily a "point of reference" function. Snap to Objects will snap to loci. Align Objects will align to a locus included in the selection to be aligned. Rotation will center on a locus included in the selection to be rotated. Snap to Locus creates a vertical and horizontal "snap line" from each locus on the active layer, to which the cursor will snap (see Page: Snap to Locus).

Symbol Placement



=

Key Equivalent

When this tool is selected the cursor in the drawing area is the Large Cross cursor. Each click of the mouse button will place an instance of the symbol selected in the Symbol Library in the drawing window. The symbol's insertion point is placed at the center of the Large Cross cursor.

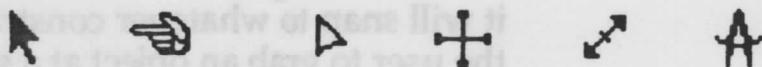
Double-clicking on the Symbol icon will open the Symbol Library. See Symbols in the == menu chapter.



Smart Cursor

Selection Cursors

This program checks to see where the cursor is on the screen and what options the user has selected then informs the user what actions may take place by changing the cursor icon. The basic cursor icons are:



Arrow Cursor

Arrow Cursor

The Arrow cursor is the default cursor of the program. It appears when the user is selecting tools or menu items. In the drawing window, the Arrow cursor indicates that the cursor is not on a point of an object by which it may be selected. The Arrow cursor will change to one of the other five cursors.



Hand Cursor

Hand Cursor

When the Arrow cursor is in the drawing window, pressing down the mouse button will change the Arrow cursor to the Hand cursor. Dragging the cursor diagonally across the screen will create a blinking rectangle (Marquee). All objects within the Marquee become selected when the mouse button is released.

Option

Hold down the Option key prior to pressing down the mouse button to get the Hand Cursor. Dragging the cursor diagonally across the screen will create a blinking rectangle (Marquee). All objects that intersect the Marquee become selected when the mouse button is released.



Move Cursor

Move Cursor

When moving the Arrow cursor around the screen, it will change to the Move Cursor when it is at a point of an object that will select the object by clicking the mouse button.



Snap Drag Cursor

Snap Drag Cursor

This cursor will only appear if Snap to Objects is selected in the Constraint Tools Palette. The Snap Drag Cursor appears when the cursor is on a snap point of an object.

If the user clicks the mouse button and holds it down, the object will follow any movement of the cursor with the snap point of the object at the center of the cursor. When moving the cursor around the drawing window it will snap to whatever constraints are set. This allows the user to grab an object at a specific snap point and then snap that point to another objects snap point.



Resize Cursor

Resize Cursor

When an object is selected on the screen, its selection handles are visible on the screen. The object may be reshaped by clicking on and dragging one of its selection handles. This cursor informs the user that the cursor is on one of the selected objects handles. Clicking and dragging the mouse when this cursor appears will reshape the selected object.



Caliper Cursor

Caliper Cursor

When the Resize Cursor appears hold down the Option key before pressing down on the mouse button. This changes the Selection Finger cursor to the Caliper Cursor. The area and perimeter of the selected object will be displayed in the Data Display Bar at the bottom of the screen.



Arrow Cursor
with Snap Dot

Snap Dot

The Snap Dot appears just below and to the right of a cursor when it is snapped to a point of an object.

Cursor Snap

The cursors will snap to the Snap Grid and Object Points depending upon the constraints activated in the Constraint Palette.

Drawing Cursors

When any tool other than the Selection Pointer is selected in the Drawing Tools Palette, Smart Cursor changes from Selection mode to Drawing mode. The program checks to see if any Constraint Tools are selected.

Screen Hints

This option is defaulted on in the Preferences dialog box when the program opens. The dialog box is brought on screen by selecting Preferences in the Δ menu.

Screen Hints gives the user several tools to work with when constraints are set:

- Indicates the cursor is snapped to a snap point determined by a constraint by placing a circle around the point.
- Describes the Snap Point by placing text on the screen to the right of the circle.
- Places the current snap point in memory as the Datum.
- Remembers all snap points touched by the cursor and emits a dotted line when the cursor is at a horizontal or vertical vector from the points.
- Allows up to two angular lines to be stroked sending out dotted angular lines.
- Allows snapping to the intersections on the dotted lines or dotted lines with objects.

Datum

When both Screen Hints and Floating Datum are active, the screen coordinates of the current cursor snap point are placed into memory. The Data Display Bar displays the snap point as if it were the 0x, 0y position of the drawing. Moving the cursor away from the Datum will indicate the x,y offset from that point.

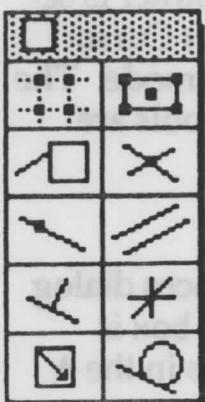
The Tab key may be used to select x and/or y in the Data Display Bar for typing in offsets from the Datum to draw to or from.

Floating Datum

Turning this option off sets the screen Origin (0x, 0y) as the point from which the Data Display Bar will set any offsets.

Constraint Palette

Introduction



This palette is a floating palette and thus may be moved around the screen. Clicking in the Close Box in the upper left of the palette will cause it to disappear from the screen. Selecting Constraint Palette from the Page menu will re-open the palette.

The Constraint Palette controls three types of snapping: Snapping to Points, Snapping to Vectors, and Snapping to Surfaces. The individual constraint tools are explained by group, not by their listing in the palette:

Point Snapping

Icon	Key Equivalents
	A
	Q
	W
	D

Vector Snapping

	Constrain Perpendicular	F
	Constrain Parallel	E
	Constrain Tangent	T
	Constrain to Angle	R
	Constrain Symmetrical	G

Surface Snapping

	Snap to Surface	S
--	-----------------	---

The icons may be selected with the mouse or Key Equivalent. Constraints may be activated or deactivated before or during drawing of objects. If you wish to use the mouse to select the icons during drawing, move the palette into the drawing area to avoid autoscrolling out of the drawing window.

Snapping

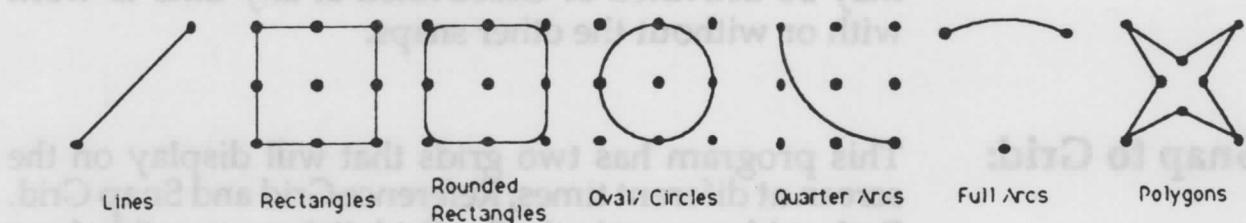
This is the ability to place the cursor precisely at a specific point so drawing, moving, or reshaping objects to exact specifications. The Constraint Palette contains the tools which may be turned on and off allowing the different snap modes.

Snap Dot

The Point and Surface Snapping Constraint Tools search to locate specific points on objects. When the cursor is within snapping radius of those points, a small dot appears to the lower right of the cursor. This notifies the user that either clicking or releasing the mouse will snap the object to the point.

Snap Points

Every object in the drawing has at least two points to which the cursor will snap when Snap to Objects is selected in the Constraint Palette. The black circles on the objects below indicate the snap points for the different types of objects. The amount of snap points on a polygon depends upon the number of vertices. (1 per vertex)



Grouped objects retain their original snap points. No new snapping points are created when objects are grouped

Snap Radius

This is the distance from an object's Snap Points at which the cursor will snap to the object. This distance is set at 10 pixels but may be changed in the Preferences dialog in the Δ menu.

Snap through Layers:

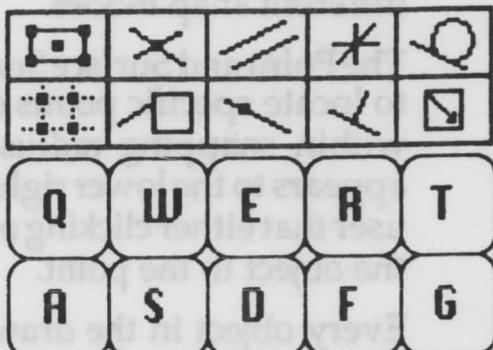
It is possible to snap to objects on layers when Layer Options are set to:

- Show / Snap Others
- Show / Snap / Modify Others

The other layers need to be set to Normal in the Layer dialog box and be the same scale as the Active layer.

Constraint Palette Key Equivalents

If you were to rotate the constraint palette 90° to the left, you would notice that it matches the key equivalent arrangement on the keyboard.



Point Snapping

These four tools snap to specific points of the drawing or objects. Each tool is independent of the other so it may be activated or deactivated at any time to work with or without the other snaps.

Snap to Grid:



A

Key Equivalent

This program has two grids that will display on the screen at different times, Reference Grid and Snap Grid. Both grids are set in the Set Grid dialog accessible from the Page menu. Double-clicking on the Snap to Grid icon or typing its key equivalent twice in rapid succession will also bring up the Set Grid dialog box.

The Snap Grid is the grid to which the cursor will snap when the Snap to Grid icon is selected. Snapping to the Snap Grid takes place both during the drawing of objects and in the movement of objects with the cursor. If the Snap Grid is set at 3" then objects will be drawn in increments of 3" when Snap to Grid is activated. Also, with Snap to Grid on, objects will move at an offset of the Snap Grid setting whether or not the object is registered on the grid.

When the Snap and the Reference Grid have the same settings, the cursor will snap to the intersections of the Reference Grid.

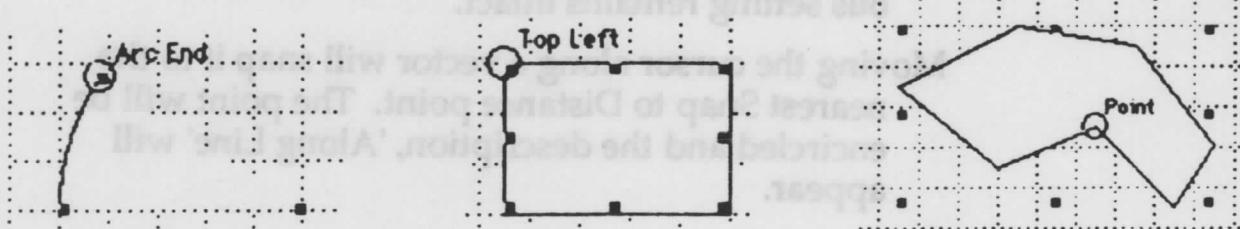
The relationship of these two grids is further explained in Page menu section under Set Grid.

Snap to Objects



Key Equivalent
Q

When this tool is activated, the cursor will snap to object points (Snap Points illustrated on the preceding page). If Screen Hints is also active, a circle will appear at an object point when the cursor snaps to it and a description of the snap point will appear to the right of the circle.



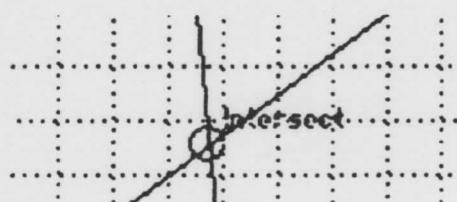
Holding down the Command key overrides Snap to Objects.

Snap to Intersection



Key Equivalent
W

Snaps the cursor to the intersection of objects, encircles the intersection point, and places the word 'Intersect' to the right of the circle.



Snap to Distance:

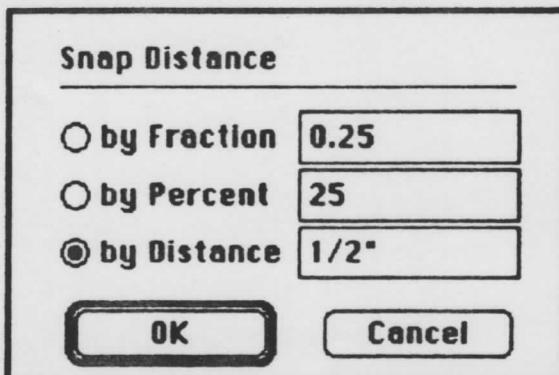


Key Equivalent
D

This tool allows the user to snap to or draw from a specified distance from either end of any vector in the drawing.

To set the snapping distance:

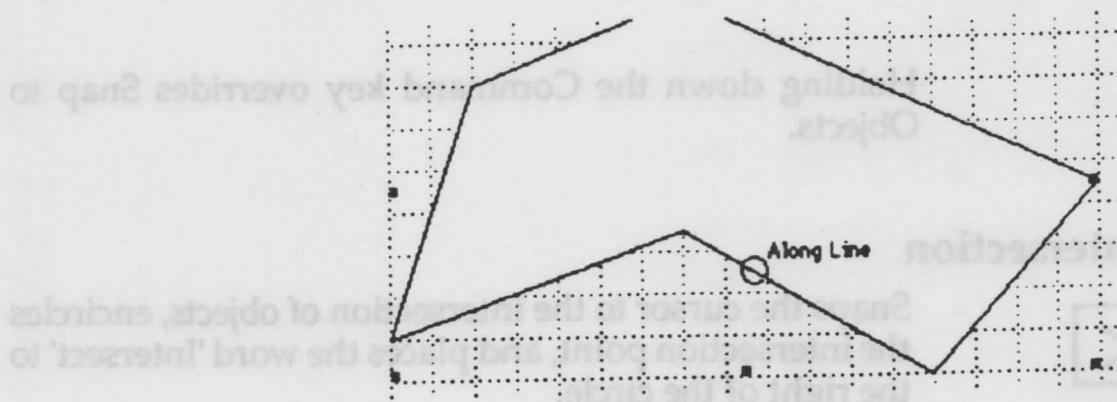
- Double click on the Snap Distance tool. This brings



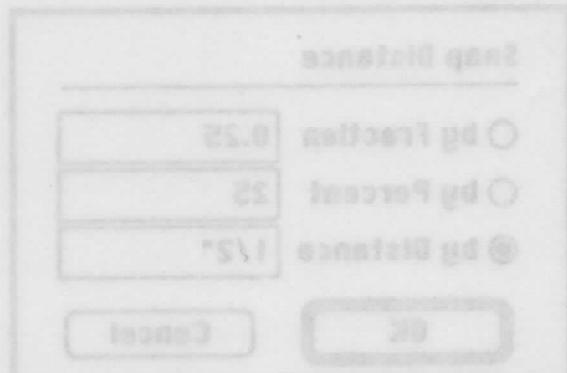
up the Snap Distance dialog box. The dialog box allows you to type in a fraction, percent or distance. Once a distance has been set in the program it will remain until the dialog box is reopened and a new distance set.

If the tool is turned off and turned back on, the previous setting remains intact.

Moving the cursor along a vector will snap it to the nearest Snap to Distance point. The point will be encircled and the description, 'Along Line' will appear.



- Double click on the Snap Distance tool. This brings up the Snap Distance dialog box.
- Double click on the Snap Distance tool. This brings up the Snap Distance dialog box.



Vector Snapping

The Vector Snapping tools place a specified constraint upon the angles at which objects may be drawn. When selecting drawing tool icons, vector snapping icons may gray out indicating that its particular type of constraint may not be used with that drawing tool. Only one of the Vector Snapping tools may be active at a time. However, any of the other Constraint Tools may be selected for use with the vector snapping tools.

Multiple Modes

Constrain Perpendicular, Parallel, and Tangent have two modes from which to determine the objects they will snap to.

Snapping to Nearest

A single click on a vector snapping tool will activate the tool to snap to vectors as the cursor comes into contact with them.

Preset Snapping

To select one object to which you want to snap, double click on the vector snapping tool or type its key equivalent twice in rapid succession.

Move the cursor to the drawing area and it will become a Pick cursor. Click the mouse when the finger tip is on the object you wish to set as the only object to be snapped to.

Deselect the vector snapping tool to deactivate Preset Snapping.

Pick Cursor



Constrain Perpendicular



Key Equivalent

F

Constrain Perpendicular allows a vector to be drawn perpendicular to or from an object. This tool may be currently used with the following Drawing Tools:

- Unconstrained Line
Snapping to or from any line, rectangle, or polygon.
- Full Arc
Setting the radius line perpendicular to or from any line, rectangle, or polygon.

- **Cubic Spline**
Snapping a segment of the spline to or from any line, rectangle, or polygon.
- **Polygon**
Snapping any segment of the polygon to or from any line, rectangle, or polygon.

Constrain Parallel



E

Key Equivalent

This tool constrains the drawing tool into creating parallel or concentric objects. If the Constrain Parallel icon dims while selecting a Drawing Tool icon, it means that a parallel can not be created with that tool.

Lines and polygons
and any object
Converted to a
Polygon are made
up of vectors.

Vectors

Snapping to Nearest

Click on the parallel constraint icon once and it will highlight (blacken) indicating that parallels may be created when the cursor is within 3 pixels of objects.

- Click and draw toward the line you want to be parallel to. When within 3 pixels, the line you are drawing will pop parallel.
- Click on the line you want to be parallel to. While drawing the parallel it may be moved to either side of the line.

Preset Snapping

Double-click on the parallel icon and it will fill with a dotted pattern. The cursor changes to an Extended Finger cursor waiting for you to select an object to create parallels to.

- After setting the line to be drawn parallel to, all lines drawn will be parallels until the tool is deactivated.

Objects

When objects are created parallel to lines or other objects, they will retain the Height to Width ratio of the object being drawn parallel to. Thus, concentric objects can be drawn with the parallel constraints.

Constrain Tangent



T

Key Equivalent

This tool will constrain lines being drawn to be tangent to or from arcs, ovals, and circles.

- Drawing to an arc, etc. the line will snap tangent.
- Drawing from an arc, etc. the line will float around the surface until the endpoint of the line is set.
Holding down the Option key will flip the tangent line to the opposite side of the arc, etc.

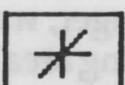
Snapping to Nearest

A single click will activate the tool to snap tangent to or from an eligible object as the cursor comes into contact with it.

Preset Snapping

Clicking twice on the icon will fill the icon with a dotted pattern and the cursor will change to the Pointing Finger cursor allowing selection of an object to be tangent or concentric to. All objects drawn while the icon remains selected will be tangent to the assigned object.

Constrain Angle

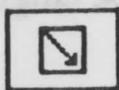


R

Key Equivalent

This tool constrains vectors to 30° , 45° , 90° , and their compliments. An additional angle of constraint may be set in the Δ :Preferences menu.

Constrain Symmetrical



G

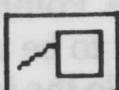
Key Equivalent

This tool constrains objects to be drawn with a Height to Width ratio of one (1:1). Thus the height and width are the same at all times. This constraint works with:

- Rectangles - Constrains to squares.
- Rounded Rectangles - Constrains to rounded squares.
- Ovals - Constrains to circles.
- Quarter Arcs - Constrains to quarter-circles.

Surface Snapping

Snap to Surface



S

Key Equivalent

This tool may be used with any tool in the Drawing Palette. When selected the cursor will snap to the surface (sides) of objects.

Snapping to Nearest

Click once on the icon to select it and it will blacken (highlight). Any time the cursor is within 3 pixels of an object the Snap Dot will appear indicating that the cursor is snapped to the surface of that object.

Preset Snapping

Double-click on the icon and it will fill with a dotted pattern. The cursor changes to a Pointing Finger, waiting for the user to select an object in the drawing area by clicking the tip of the finger on the object.

The object selected is the only object in the drawing to whose surface the cursor will snap while the Snap to Surface icon is activated.

File Menu

<i>Commands</i>		<i>Menu</i>
⌘ N	4.1	New
⌘ O	4.1	Open...
⌘ W	4.1	Close
⌘ S	4.1	Save
	4.1	Save As...
	4.1	Save as Template
	4.1	Revert
	4.2	Import...
	4.3	Export...
	4.6	Page Setup...
⌘ P	4.7	Print...
⌘ Q	4.7	Quit

File Menu Popout Menus

		File Menu	Commmands
	Import...		
4.2	PICT	New	⌘ N
4.2	PICT as Picture	Open	⌘ O
4.2	Text Format		
4.2	DXF	Import	⌘ W
4.2	Worksheet	Save	⌘ S
	Export...		
4.3	PICT	Revert	⌘ A
4.4	Text Format		
4.4	DXF	Import	⌘ D
4.5	Encapsulated Postscript	Save	⌘ S
4.5	Database	Print	⌘ P
4.5	Worksheet	Print Preview	⌘ L
		Quit	⌘ Q

New

(⌘ N)

Selecting New opens a new document with the name 'Untitled'. The New document will have the defaults listed in the Overview section of this manual.

The program allows up to four documents to be open at the same time. When no more documents may be opened the New command is dimmed in the File menu.

Open

(⌘ O)

The Open command displays the system File Menu listing of files that may be opened with this program. Double-clicking on a file in the listing will open it.

Close

(⌘ W)

The Close command closes the current document window. Selection of this command is the same as clicking on the Close Box in the upper left hand corner of the document window. A 'Save Changes' dialog will appear upon closing a file if any changes have been made to the file since the last save.

Save

(⌘ S)

The Save command is grayed out until a change is made to the named document. Save writes the current changes of a document to the 'Open' file.

Save As...

Save As.. is selectable at any time. This command allows the user to save the document by the same or a new name.

The main difference between Save and Save As is that Save As rewrites the entire file to the volume while Save edits the file.

Save As

Template

This is similar to Save As.. . However, when a Template file is opened, it will open a copy of the original template with 'Untitled' as its name. The user may then work with the copy of the template that is open without fear of changing the original.

Revert

Reopens file from last save. A dialog box will appear asking if you are sure you want to do this. When a Revert is executed, all changes made since the last save are lost.

Import Selecting Import will cause a popup menu to appear. The current open document may Import files that are in formats shown in the popup menu. These data imported will be brought into the active layer and become part of the open document.

PICT Files saved as PICT that have been made with object orientated programs will carry the object attributes with the PICT file. These objects may then be edited as any MiniCad+ object.

A PICT file is brought into a document at paper scale so it is important to import a PICT in the same scale it was created.

PICT as Picture Files saved as PICT in raster based (paint) programs do not carry object attributes. These files are imported as Bitmaps. A bitmap can only be rotated or proportionally resized.

Text Format MiniCad+ documents that have been saved (exported) in Text Format may be imported into any open Mini-Cad+ document.

DXF DXF is a file format which several CAD programs use to allow transfer of accurate data from one program to another. This includes programs on different computers.

With the file on the Macintosh , select Import; DXF. Double-click on the DXF file name. MiniCad+ will translate the file into the open document.

When files are brought in from other computer environments there may be some minor differences in font styles and sizes. DXF files do not carry unit types so it is necessary to set the units the same as the original file.

Worksheet

The dialog box that appears when selecting this menu option is similar to other file search boxes. Select the worksheet name and select Open.

The program will interpret the worksheet format and enter it into the program. Imported files may be formatted as:

- Comma
- Tab
- Merge
- DIF
- SYLK

Export

Selecting Export will cause a popup menu to appear. MiniCad+ files may be exported by any of the formats below. Exporting a file by a different format does not change the original file. It creates a new file in the format selected.

When exporting files a dialog box appears prompting the user to type a name for the new file. Exported files should be given a name different than the original so the original is not replaced by the export.

PICT

Exporting in the PICT format allows users to import the files in programs other than MiniCad+. However the high resolution of MiniCad+'s internal format is lost when the file is exported as a PICT file.

The files exported as PICT will carry object oriented attributes such as thin lines, fill patterns, etc.

Text Format

Exporting as a Text file has two main purposes:

Startup Files:

A Startup file is created the first time this program is booted. From then on the program may be opened with the Startup file. This file contains all of the initial defaults of MiniCad+.

Some changes made to the defaults such as grid settings, line weights, and colors may be saved to a new Startup file. This is done by using Export: Text while any document is open and saving it as *MiniCad Startup..*

It is important to note that not all default changes may be saved in this manner. For example, changes in Preferences will not be saved.

Macros may be placed in the file with a text editor and will be available in the program upon opening. All graphic objects including symbols may be saved with the Start-up file. However, since the startup file is in text format, the importing of the file and creation of the graphics takes longer than opening a Template.

All Start-up files will open as Untitled documents.

Macros:

Exporting and reading a text file is extremely helpful when learning MiniPascal for the creation of macros.

DXF

Exporting a MiniCad+ file in DXF format allows the transfer of high accuracy data into other programs of equal precision inside or outside the Macintosh environment. Simply choose this menu item and a dialog box will appear. Type in the name you wish to give your new DXF file. Check your file location (drive:folder) and click on the Save button. This dialog works and looks much the same as any standard Macintosh Save dialog.

Encapsulated PostScript

Exporting a drawing as Encapsulated PostScript creates a file that, at present, may be imported into PageMaker at very high resolution. Encapsulated PostScript saves a PICT representation of the drawing with the postscript file. This PICT allows the user to see the drawing he has placed into PageMaker. A normal postscript file would only show a gray outline of the imported file once placed into PageMaker.

An encapsulated postscript file supports the eleven font families that are built into the LaserWriter Plus, LaserWriter IIINT, and LaserWriter IIINTX. The fonts are:

AvantGarde, Bookman, Courier, Helvetica, Helvetica Narrow, New Century, Palatino, Symbol, Times, ZapfChancery, and ZapfDingbats.

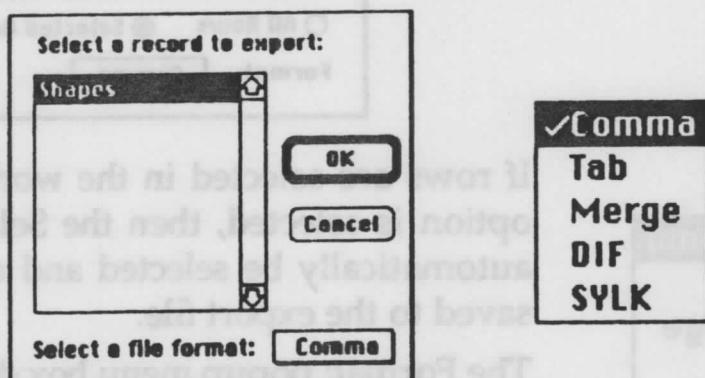
All other fonts that are exported will be automatically substituted by the Times font in the chosen style and size.

Database

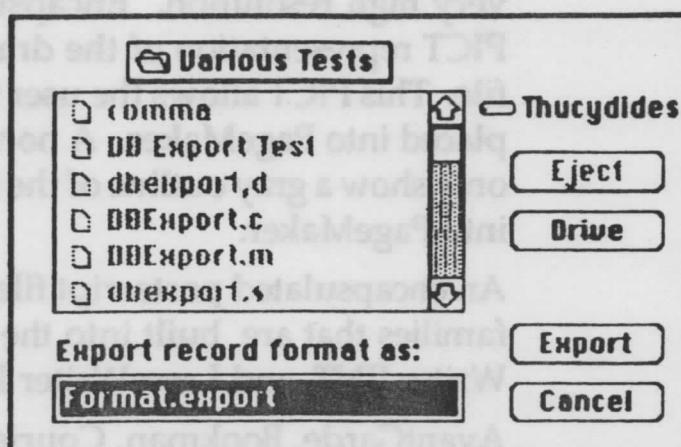
A record with its fields and data may be exported in the following formats:

- Comma
- Tab
- Merge
- DIF
- SYLK

The first dialog box to appear after selecting the database menu item prompts the user to first select a record then select a format from the popout button at the bottom right of the box. Then click OK.



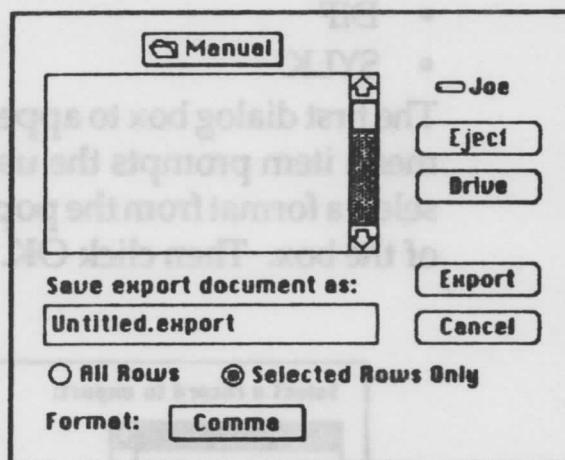
The second dialog box to appear prompts the user to give the exported record a name.



Worksheet

The Worksheets created in MiniCad+ may be saved in one of five formats and given a name. These worksheet may then be imported into any program that will read the formats.

The dialog box that appears when selecting this menu item is similar to the Save As... dialog box. The program will save all rows in the worksheet when the All Rows button is selected.



If rows are selected in the worksheet when this menu option is selected, then the Selected Rows button will automatically be selected and only those rows will be saved to the export file.

The Format: popup menu box defaults to comma. Slide the cursor down the popup menu to select another format.

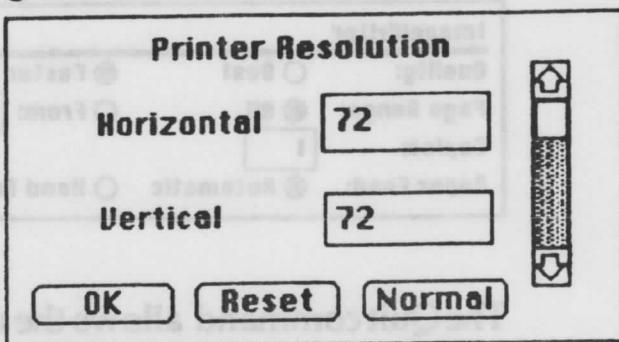
✓Comma
Tab
Merge
DIF
SYLK

Page Setup...

Selecting Page Setup.. will bring up a dialog box in which you set the printing resolution for the printer or plotter driver selected in the Chooser in the Apple menu. The example here is the Imagewriter.

Reset

Clicking the Reset button will set the program to the



default of the driver. Above the default is 72 x 72 dpi.

Scroll Bar

If the default is not the resolution wanted then use the scroll bar to the right of the defaults to select the resolution wanted.

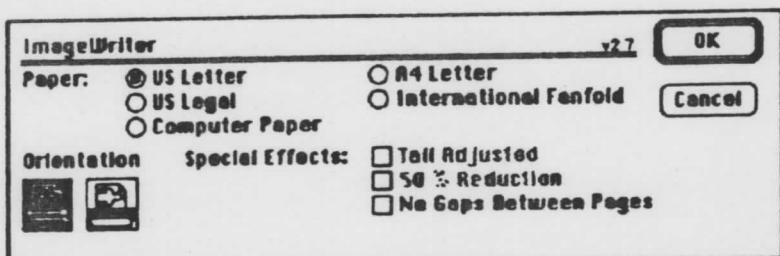
OK

When satisfied with the settings click the OK button to close this dialog box.

Normal

This allows the user to access Special Effects boxes which are usually grayed out in the next dialog box. It also changes the resolution to 72 x 72 dpi if the resolution is currently set higher. After clicking the OK or Normal button another dialog box appears.

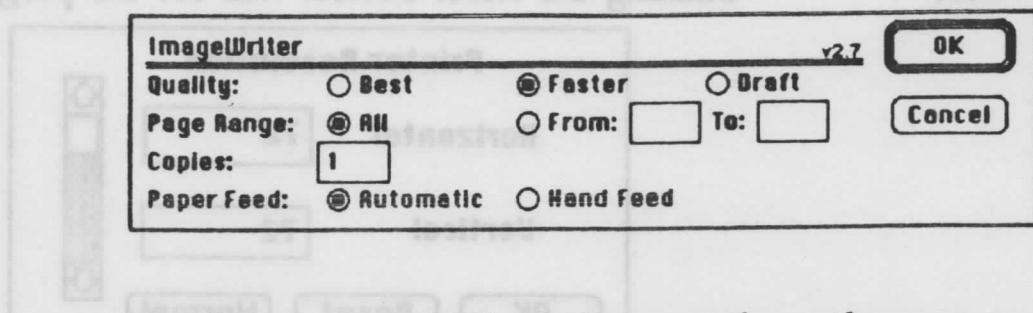
Here you select the Paper size, Orientation, and Special Effects. Clicking the OK button in this dialog box sets the printout and returns you to the drawing window.



Print

(* P)

The dialog box that appears after selecting Print indicates which printer driver has been selected in the Chooser. Clicking the OK button will send the file to the printer or plotter that is selected.



Quit

(* O)

The Quit command allows the user to leave the program and return to the Finder. Before the program terminates, the user will be presented with a Save Changes? dialog box. If the response is 'Yes', the document will save or bring up the Save As dialog box if the document is untitled. 'No' terminates the program and returns you to the Finder without saving the current file. 'Cancel' keeps you in the current document.

Edit Menu

<i>Commands</i>		<i>Menu</i>		<i>Option Menus</i>
⌘ U	5.1	Undo		
⌘ X	5.1	Cut		grouping
⌘ C	5.1	Copy		Nodes
⌘ V	5.1	Paste	Paste in Place	5.1
	5.1	Clear		Copy Options
⌘ D	5.2	Duplicate	Duplicate Array	5.2
⌘ A	5.2	Select All		
⌘ R	5.7	Reshape	Reshape by Dialog	5.6
	5.7	Smoothing		
	5.7	Mirror		
	5.7	Scale Objects		

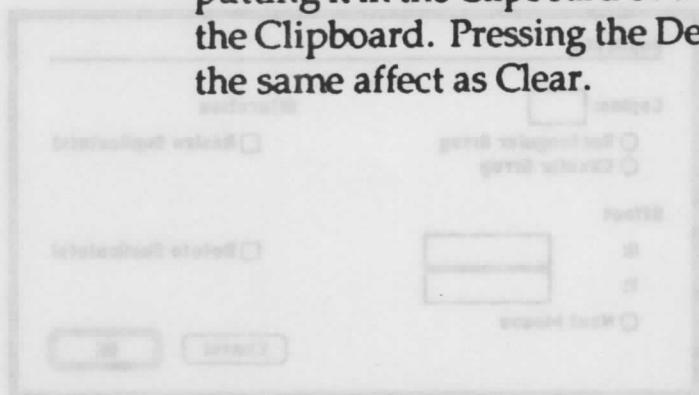
Edit Menu Popout Menus

Smoothing

5.7 None

5.7 Bezier Spline
5.7 Cubic Spline

Undo (⌘ Z)	This command undoes the previous execution of the program when it is selectable from the menu.
Cut (⌘ X)	Removes the current selection from the drawing and places it on the Clipboard where it is available to be pasted elsewhere. The basic difference between Cut and Copy is that with Cut, the selection is removed from the drawing. Once in the Clipboard, it will remain there until replaced by another Cut or Copy.
Copy (⌘ C)	Places a copy of the selected objects into the Clipboard for pasting to this or other programs. Once in the Clipboard it will remain there until replaced by another Copy or Cut. The original selected objects on the drawing remain intact.
Paste (⌘ V)	Places the contents of the Clipboard to the center of the drawing area. The Clipboard information is not destroyed until another selection is cut or copied.
Paste in Place (Option ⌘ Z)	Holding down the Option key prior to selecting Paste from the menu will place the drawing information at the same coordinates from layer to layer or file to file. This allows for precise registration. It is important to note that when pasting from layer to layer or file to file, objects are rescaled to the scale of the receiving layer or file automatically.
Clear	Removes the current selection from the drawing without putting it in the Clipboard or affecting what is already in the Clipboard. Pressing the Delete or Backspace key has the same affect as Clear.



Duplicate

(⌘ D)

This command creates a duplicate of any selected object(s). The duplicated object(s) are placed to the upper right of the original object(s) on the screen.

When a duplicate is created, it becomes the selected item. If the duplication is moved while it is still selected, the program remembers the distance and direction moved and any additional duplications will carry that offset.

Offset Duplications

The Offset Duplications item found in the Δ menu : Preferences dialog box is selected as a default of the program. This is what offsets the duplications from the originals. Deselecting this box will place duplicates on top of the original.

Duplicate Array (Option ⌘ D)

The menu item Duplicate will change to Duplicate Array if you hold down the Option key before clicking on the Edit menu. Selecting Duplicate Array will bring up the dialog box below.

The Duplicate Array dialog box is also accessible if the Option key is held down while pressing the Command and D keys.

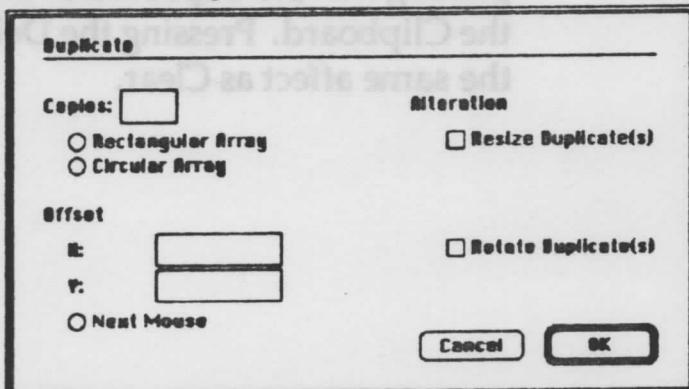
The Duplicate Array dialog box gives several options when making duplications.

Type:

- String of duplications at specified x, y distance apart.
- Rectangular arrays with columns and rows at specified x, y distance apart.
- Circular arrays set by angle distance apart.

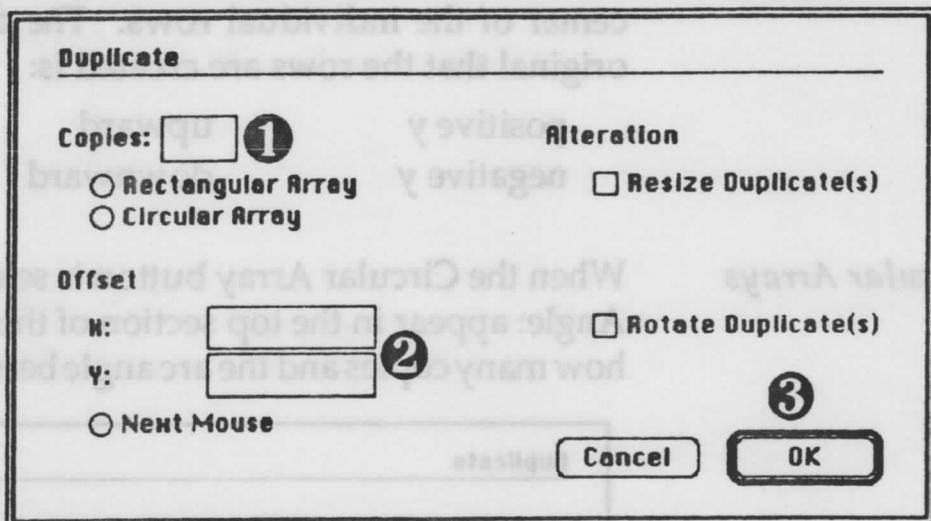
Alterations:

- Rotate any type of duplication.
- Resize each duplicate.



String Array

1. Type number of duplicates.
2. Type x and y distance from center of original to center of duplicate. If 'Next Mouse' is selected, the program will wait for you to click the mouse in the drawing area to set the offset for duplication.



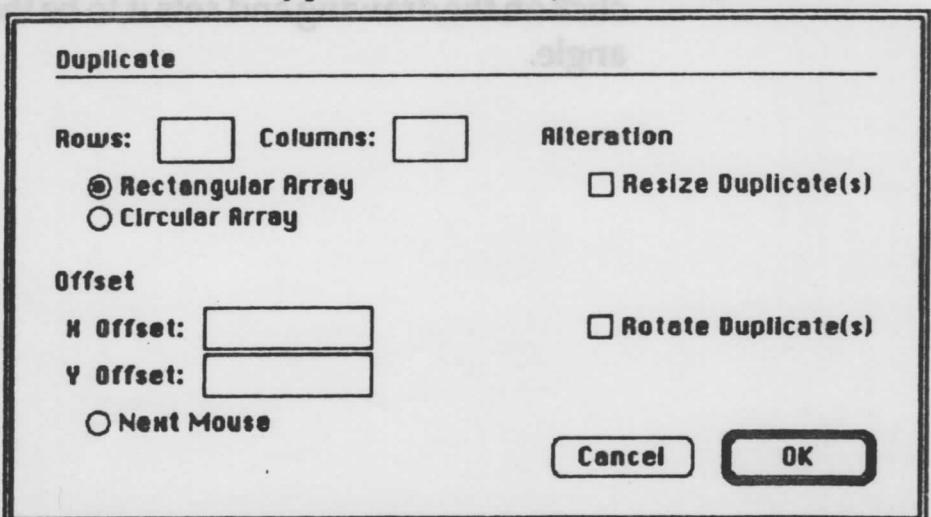
The direction of duplication is controlled by value of the X: and Y: data. From the original:

positive x	to the right
negative x	to the left
positive y	upward
negative y	downward

3. Click OK button

Rectangular Array

Selecting this button will place the duplications into rows and columns. The Copies: input box changes to Rows: and Columns: Type in how many of each you want.



The X: offset determines the distance from center to center of the individual columns. The direction from the original that the columns are created is:

positive x to the right

negative x to the left

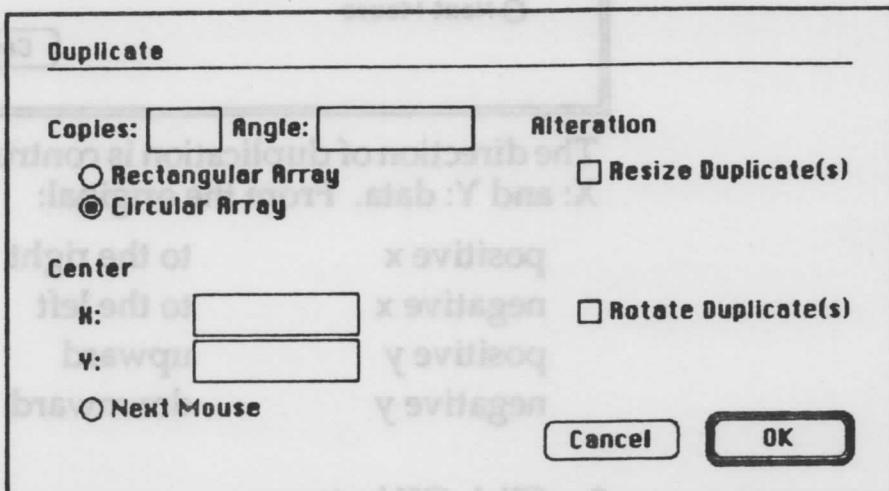
The Y: offset determines the distance from center to center of the individual rows. The direction from the original that the rows are created is:

positive y upward

negative y downward

Circular Arrays

When the Circular Array button is selected, Copies: and Angle: appear in the top section of the dialog box. Type how many copies and the arc angle between their centers.



The 'Offset' heading in the dialog box changes to 'Center' when Circular Array is selected. The data typed in the X: and Y: boxes is to set the radius for the arc angle. When using 'Next Mouse' the program waits for the next mouse click on the drawing and sets it to be the radius for the arc angle.

Resize Duplicate(s)

Resize Duplicate(s)

H Scale:

Y Scale:

When the button is clicked two data input boxes appear just below it. These boxes are for scaling the objects being duplicated. The object's X and Y size is multiplied by the factor typed into the box.

A decimal less than 1.0 would reduce the size of the duplicates while any integer and decimal above 1.0 would enlarge the duplicates.

Each duplicate is scaled individually from the previous object (original or duplicate).

Rotate Duplicate(s)

Rotate Duplicate(s)

Angle:

Clicking this button will bring up an Angle: input box. Each duplicate is rotated individually by the angle typed from the previous object (original or duplicate).

Select All

(⌘ A)

This menu item selects all visible objects on the Active layer. When Layer Options is set to Show / Snap / Modify Others, all visible objects on all Normal layers will become selected.

Reshape

(⌘ R)

Selection of the Reshape menu item with an object(s) selected will cause one of four possibilities to occur.

Single object or single group selected:

- A Reshape dialog box similar to the Create dialog box will appear to allow the reshape of the selected object.
- If a polygon is the selected object, all its vertices will become individually selected for reshape by clicking and dragging a vertex. See Polygon in the Drawing and Constraint Tools chapter.

Multiple selected objects

- Multiple Reshape (Rubberbanding)

The cursor changes to the Multiple Reshape cursor which allows drawing a marquee around an area and stretching objects that intersect the marquee while maintaining the offset of objects inside the marquee. Polygons, Freehand Curves, Splines, and Lines may be stretched. Other objects that are completely enclosed by the marquee will move by the specified offset.

3D objects

- A 3D Mesh can not be reshaped with the Reshape menu item. Nothing happens.

Holding down the Option key prior to selecting the menu item or Command / R will bring up a dialog box for reshaping polygons similar to the reshape dialog for other objects.

Reshape by Dialog...

Selecting one of the popup choices from the menu while a polygon(s) is selected in the drawing, will change the the polygon's form.

None

Smoothing

None
Bezier Spline
Cubic Spline

Straight lines between points of polygons.

Bezier Spline

Converts polygons and freehand lines into equivalent Bezier Spline curves. This creates curved lines based on an average distance between vertices.

Cubic Spline

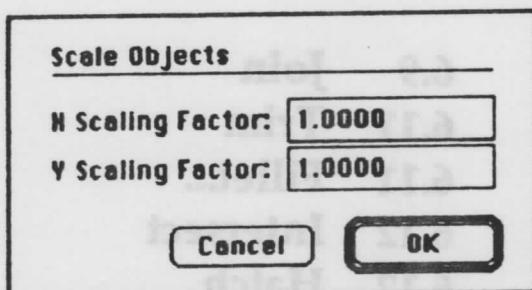
Converts polygons and freehand lines into equivalent Cubic Spline curves. This creates a curved line that goes through the vertices' points.

Mirror

(⌘)

Scale Objects...

Allows the user to create a mirrored image of an object at any angle by drawing a line at the desired angle after selecting the menu item. The original is deleted from the screen.
To retain the original, hold down the Command key prior to selecting Mirror from the menu.



Any selected object(s) and/or group(s) may have its overall X and/or Y dimension changed with this menu selection. The dialog that appears prompts the user to type a rescale factor into one or both input boxes. The default numbers in the dialog box would multiply an object by a factor of one thus the object would remain the same size. Typing any decimal less than one would reduce the selected object. Typing in any number larger than one will enlarge the object. The rescale is done from the center of objects.

Tool Menu

Commands

Menu

Option Menu

⌘ H	6.2	Dimension H...
⌘ K	6.2	Dimension V...
	6.3	Diagonal Dimension
	6.3	Angular Dimension
	6.4	Witness Lines
	6.5	Add Surface
	6.6	Clip Surface
	6.6	Intersect Surface
	6.6	Convert to Lines
	6.7	Convert to Polygons
	6.8	Combine into Surface
⌘ J	6.9	Join
⌘ T	6.11	Trim
	6.11	Fillet...
⌘ I	6.12	Intersect
	6.12	Hatch

Join & Fillet... 6.10

Auto-Dimensioning

Tool Menu Additional Menus

- Angle Dimension
- Distance Dimension
- Line Angle
- Align Perpendicular Joints
- Copy Dimension
- Chain Dimension H... **6.2**
- Chain Dimension V... **6.2**

Auto-Dimensioning

This program allows the user to select objects and then select an auto-dimensioning tool from the menu. The program automatically dimensions:

- Horizontally
- Vertically
- Diagonally
- Line Angle
- Angle between two lines

There are several options that also may be chosen:

- Chain Dimensions
- Dimension between objects

Dimension Accuracy:

- Dimension text displays accuracy set in Units dialog box in Page menu

Dimension text:

- Uses last text font and size set in Text menu but may be edited
- Offset from Dimension line may be set in Preferences menu
- Vertical dimension text is set to auto-rotate parallel to dimension line in Preferences menu but may be turned off
- Dimension text will update when dimension is selected with object being resized
- Unit of measurement of text will update if unit measure changed in document.
- All dimensions are automatically placed into the Class: Dimension.

Dimension Line Markers:

- Last marker style set in // menu.
- Size changed by holding down Option key when selecting Text menu.

Horizontal and Vertical Dimensions

(**⌘ H - ⌘ K**)

These two menu items work similar. Horizontal Dimension gives the overall X distance between the endpoints of all selected objects. Vertical dimension gives the overall Y distance between the endpoints of all selected objects.



Set Distance Cursor

Select the object or objects that you wish to dimension and then select the menu item or use the Command function. A Set Distance cursor will appear. Click the cursor where you want to place the dimension. The crosshair of the cursor is the placement point.

The Set Dist cursor may also be moved a specific distance from an object by using the Data Display Bar to set the X or Y datum.

Chain Dimensions



Bullseye Cursor

Chain dimensioning allows the user to dimension the distances between points of an object or several objects by clicking the bullseye cursor on the points. The points that may be dimensioned are the vertices of objects and the snap points. The snap points are dependent upon which constraint tools are selected.

Holding down the Shift key prior to selecting either Horizontal or Vertical dimension tools will change the menu selection to read:

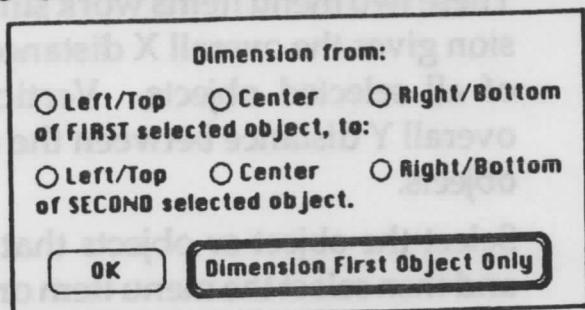
Chain Dimension H... ⌘H
Chain Dimension V... ⌘K

The Set Dist cursor will appear. Click the cursor to set the distance from the objects to be Chain Dimensioned. The cursor will change to the Bullseye cursor. Move the cursor to the first object point and click the mouse. Move from object point to object point and click the mouse for each dimension wanted. Double-click on the last point in the dimension.

Dimension between Objects

After selecting an object and selecting either Horizontal or Vertical dimension, clicking on another object with the Set Dist cursor will bring up a dialog for dimensioning between points of the two objects.

Click on the buttons for the points to be dimensioned and click the 'OK' button. Click the 'Dimension First Object Only' button if the selection of the second object on the screen was an error.



Only' button if the selection of the second object on the screen was an error.

Diagonal Dimensions

This selection from the menu allows the dimensioning between any two clicks of the mouse at any angle.

- The Bullseye cursor appears after selecting Diagonal dimension.
- Click once with the cursor to set the point for the beginning of the dimension. Click a second time with the Bullseye cursor to set the end of the dimension.
- Set Dist cursor appears so you can set the distance for the placement of the dimension line and text.

Angular Dimensions

This is used to give the angle of a line or the angle between two lines.

When one line is selected:

- select which endpoint of the line for the angular dimension with the Command key
- select a horizontal or vertical vector to measure angle from
- move the cursor to or from the angle intersection to set the distance for the placement of the dimension

With two lines selected:

- move the cursor to or from the intersection of the lines to set the distance from the intersect to place the dimension
- hold down the Option key if an outside angle is preferred
- Command key toggles between possible quadrants

Dimension Options

In the Preferences dialog box there are several options that may be set and changed at any time.

Dimension Offset

This option defaults to a 0 text point offset. The dimen-

Dimension Offset: points

sion text is placed on top of the dimension line. Typing a positive or negative number will offset the text from the line in a positive or negative direction

Auto-rotate dimension text

If this box is checked, all dimension text will be placed parallel to the dimension line. When this box is un-

Auto-rotate dimension text

checked as it is here, all dimension text is placed horizontally on the drawing.

Dimension Lines

When a dimension menu item is selected, the dimension lines will be drawn at the last thickness and style set in the Lines menu.

Witness Lines

When this menu item is checked all dimensions will be made with Witness Lines. These lines begin 1/8" from the vertices of the object being dimensioned, touch the dimension line markers, and extend past the dimension line 1/8".

Surface Functions

This program handles lines and objects which have surfaces differently. Objects with surfaces may be:

- Added together to create one object.
- Clipped one from another to cut out specific shapes
- Intersected (overlapped) and a new object created from the area of overlap
- Converted to lines
- Converted to polygons

Lines may be:

- Combined into or with objects which have a surface

Add Surface

Any object that has a surface may be added to another object that has a surface to create a single object.

Objects that may be added together:

- rectangle
- rounded rectangle
- oval / circle
- quarter arc
- full arc
- polygons (regular, freehand, and splines)

When objects are added together the new object is a polygon.

Fill Patterns:

- When two objects are placed together or overlapped for Add Surface, the object in the front is added to the object in the back. The newly created object carries the fill pattern of the object in the back.

Open Objects

When Add Surface is used with open objects, the objects are closed to create closed polygons

Arcs:

- An arc with no fill pattern is closed from the one end of its arc segment to the other.

- An arc with a fill pattern is closed with its radius lines included.

Polygons:

- Closed from endpoint to endpoint.

Clip Surface

Removes (clips) overlapping areas of two surfaces. The object to the front is the one that clips the other. Arcs and open polygons are closed as explained for Add Surface.

Intersect Surface

Creates a new surface from the overlap of two selected objects. Arcs and open polygons are treated as explained in Add Surface. The new surface will carry the fill pattern of the object in the back.

Convert to Lines

Any object may be converted to lines. Select the object(s) then select Convert to Lines. The original object will be replaced by lines.

If you wish to retain the original object, hold down the Command key before selecting Convert to lines from the menu. The lines are placed on top of the original object.

Conversion Resolution

How many lines the object is converted to depends upon the object and Conversion Resolution in the Preferences menu. Conversion Resolution in the Preferences dialog box is the number of line segments per 360° of arc.

Rectangle

- Becomes four lines

Rounded Rectangle

- Sides converted to four lines
- Arced corners are 90° each thus each arc is replaced by $1/4$ of the Conversion Resolution

Oval / Circle

- Converted at Conversion Resolution

Arcs

- All arcs are converted similarly. Divide the angle of the arc by 360 then multiply the result by the conversion resolution.

- When an arc with a fill pattern is converted to lines, two more lines are added for the radius lines.

Polygons

- Regular and Freehand

One line for each segment of the polygon (one less than total vertices).

- Splines

Each spline segment is treated as an arc.

Convert to Polygons

This menu selection will change objects that have a surface into polygons. Select the object(s) then select Convert to Polygons. This replaces the original object(s) with a polygon(s).

To retain the original object hold down the Command key prior to selecting Convert to polygons from the menu. This will place a duplicate that has been converted to a polygon on top of the original. The current fill pattern will be assigned to the polygon.

Conversion Resolution

Conversion Resolution also has an effect on objects that are converted into polygons if those object have arc segments.

Rounded Rectangle

- Arced corners are 90° each thus each arc is replaced by $1/4$ of the Conversion Resolution

Oval / Circle

- Converted at Conversion Resolution

Arches

- All arcs are converted similar. Divide the angle of the arc by 360 then multiply the result by conversion.



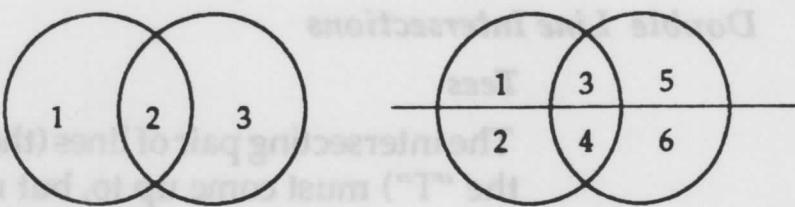
Converting a circle to a polygon with Conversion resolution set to 8 would create an octagon.

Combine Into Surface

Any combination of lines and/or objects may be combined into a new surface (polygon) as long as the combination will create a closed object.

Select the objects then select Combine Into Surface. The program will wait until the user clicks the cursor inside the area to be combined into the new surface.

The program waits for the user to define the new surface area because there may be more than one possibility of a new surface from the objects selected.



If the two circles above were selected, Combine Into Surface would allow the possibility of three new objects. The program waits until you click inside one of the three areas before it continues. Clicking outside the areas would create nothing.

Placing a line through the two circles doubles the possibilities to six.

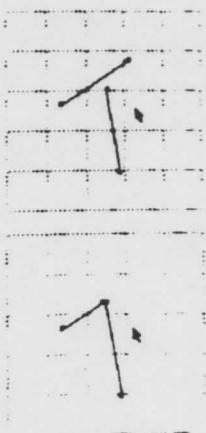
Join (⌘ J)

Single Line Intersections

- Select the two lines to be joined.
- Choose Join from the Tool menu (or Command J).

Option / Join

Holding down the Option key prior to selecting Join will join the lines without trimming any portion of either line that may extend beyond the intersection.

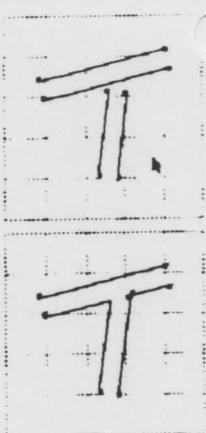


Double Line Intersections

Tees

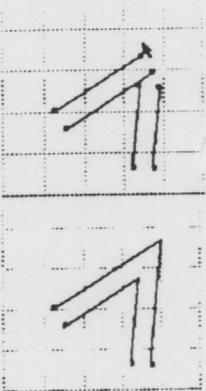
The intersecting pair of lines (the stem of the "T") must come up to, but not completely through, the pair of lines to be intersected (the crossbar of the "T").

If the stem totally intersects the crossbar, Join will create a Cross intersection.



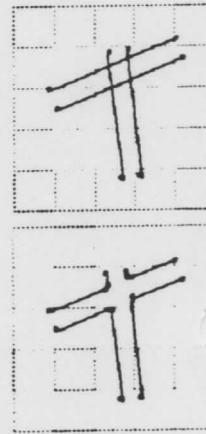
Corners

The outermost line of either of the two pairs of lines must not intersect both of the lines in the other pair, otherwise a tee will be formed (see above).



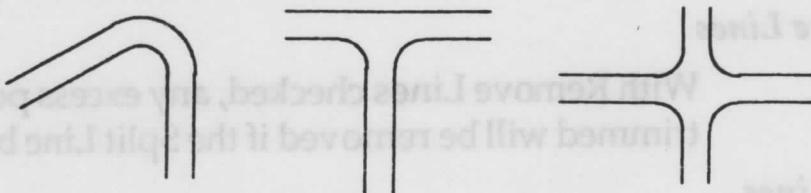
Crosses

Crosses are formed when two sets of double lines completely cross one another.



Holding down the Option key prior to selecting Join will change the menu to Join & Fillet. This command brings up a fillet dialog box prompting the user to type a radius for the fillet.

Filletted Corner, Tee, and Cross intersections.



(⌘ T)

The Trim tool cuts lines only. To cut objects with a surface you use the Surface tools explained earlier in this chapter.

All Lines

Any object may be used to trim lines. Select the object to trim with and then select Trim from the menu. The object will trim all lines that it intersects.

Selected Lines

If the object you are trimming with overlaps lines other than the one you wish to trim, select all the ones to be trimmed along with the object you want to trim with. Since more than one object is selected, the program does not know which object is to do the trimming. A Pointing finger cursor appears on the screen. Move the cursor so the end of its finger is on the object to trim with. Click the mouse button and the object will trim the selected lines.

Selecting any two non-parallel lines and choosing the Fillet... tool will create between those lines a fillet (an arc of specified radius joining the two lines) tangent to each line. In the dialog box the user will note three features, the Fillet Radius, Remove Lines, and Split Lines.

Fillet Radius

This text field will allow the user to enter in a specific radius or use the estimated default.

Remove Lines

With Remove Lines checked, any excess portion of a line trimmed will be removed if the Split Line box is checked.

Split Lines

With Split Lines checked, the lines that intersect the fillet will be cut at the intersections.

A fillet radius of zero will join any two non-parallel lines and trim them to their intersection. This is similar to Join.

If the fillet radius selected is too small, the program will beep. A radius which is too big to be fit to the two selected lines will cause a dialog box with an appropriate message to appear. If the user has chosen a pair of objects which the program cannot fillet, a dialog box with a message to that effect will appear.

Fillet Options

All vertices of a polygon can be filleted to a given radius. The polygon is converted to lines and all adjacent pairs of lines are filleted using the Fillet command. Any fillets which will not fit on the adjacent line pairs are skipped. These lines can then be filleted at a smaller radius.

Any object converted to a polygon may be filleted in this manner.

Filleted polygons are converted to arcs and lines. If these objects combine to make an enclosed object they may be selected and Combined Into Surface to make a new object.

Object

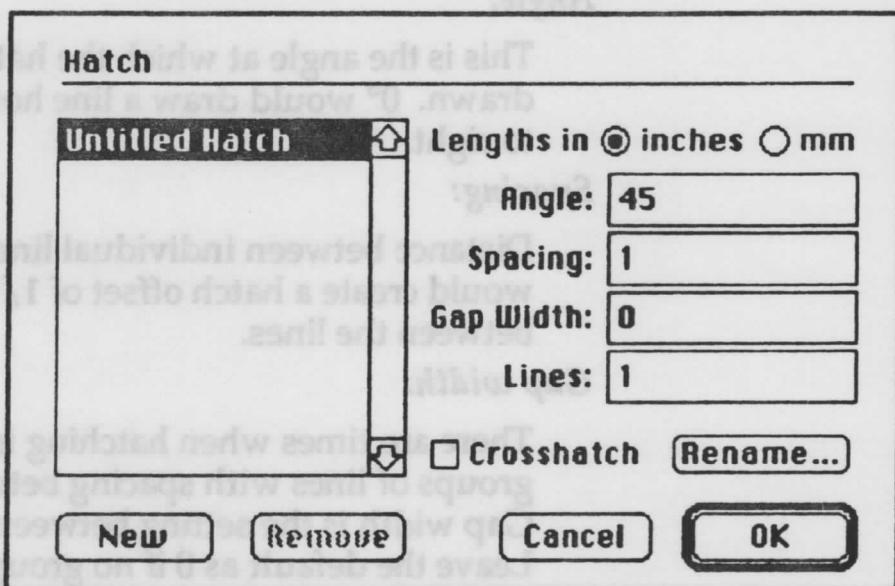
Places a locus at the exact intersections of selected objects and any lines or polygons which it crosses. With Snap to Locus on, horizontal and vertical lines will be created from these intersection points. Objects can then be snapped to these lines for exact placement.

Hatch...

Hatch patterns may be created, saved with a specific name within a file, and the file may be used to create a template for future access to intricate hatching.

Using Hatch Patterns

Select an object(s) then select a Hatch. From the dialog box that appears select the Hatch pattern. Click the OK button. When the screen redraws, click the cursor in the area of the selected objects to be hatched.



Hatch Dialog Box

The names of all Hatch patterns saved in the file appear in the left scroll window of the dialog box. The default name is 'Untitled Hatch'.

Hatch names may be created, renamed, and removed. Removing the name removes the hatch pattern from the file.

The data for a hatch name may be edited by selecting the name to edit and inputting new data. Clicking the OK button will set the existing data to whichever hatch name is selected.

Creating a Hatch

To create a new hatch name, click the New button.

Type a new hatch name. Then select any of the data input boxes described below and type in the appropriate information.

Hatch patterns are created in world scale. A quarter inch space is one fourth of an inch on the screen and printout regardless of the scale of the drawing.

Click the button to set whether the hatch line offsets are to be in inches or mm's.

In the data section of the dialog box the tab key will move from one input option to the next.

Angle:

This is the angle at which the hatch lines are to be drawn. 0° would draw a line horizontal from left to right.

Spacing:

Distance between individual lines. Inputting 0.1" would create a hatch offset of 1/10th of an inch between the lines.

Gap width:

There are times when hatching is done with groups of lines with spacing between the groups. Gap width is the setting between these groups. Leave the default as 0 if no groups are wanted.

Lines:

Type in the number of lines in a group for grouped lines. Leave as 1 if no groups are wanted.

Crosshatch:

If a crosshatch design is desired, click on the small box to the left of the word, Crosshatch. An X in this box means that a crosshatch pattern will occur. The crosshatch will be created perpendicular to the hatch angle.

= = Menu

Commands Menu

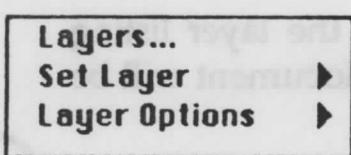
	7.1	Layers	8.7
	7.8	Set Layers	8.7
	7.8	Layer Options	8.7
⌘ G	7.10	Group	
⌘ U	7.10	Ungroup	
	7.11	Enter Group	
	7.11	Exit Group	
	7.11	Top level	
	7.12	Classes	
	7.14	Create Symbol	
	7.16	Select Symbol	
	7.19	Symbol to Group	
	7.19	Link Text to Record	

= = Menu Popup Menus

Layer Options

- 7.8 Active Only
- 7.8 Gray Others
- 7.8 Show Others
- 7.9 Show / Snap Others
- 7.9 Show / Snap / Modify Others

Introduction to Layers



Layering is an essential part of any CAD package, allowing the user to design documents that may be selectively superimposed to create a drawing or several drawings. The user may prefer to draw on one layer, or may separate the drawing information between many layers.

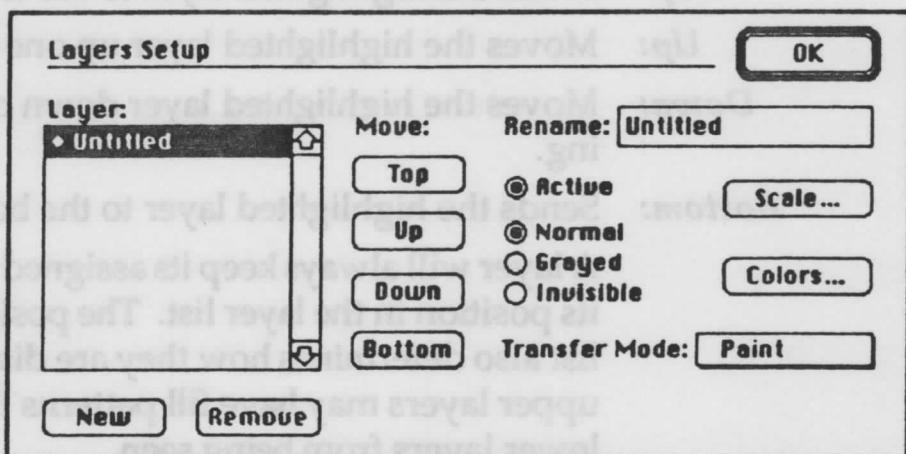
Layers are subsets of the document which may be viewed in a variety of formats, separately edited, and scaled. They can be thought of as multiple sheets of clear tracing film which are in perfect registration. Layers can be viewed or hidden at will, allowing many different types of information to be superimposed. The arrangements and layer attributes you assign and configure on the screen determine how the document prints.

While in the Layers dialog box, there are several Command key functions that perform differently than at other times in the program. A listing is provided later in this chapter.

When first launching MiniCad+, the word, Untitled, appears twice on the screen: Once for the document name at the top of the screen and second for the active layer which is displayed in the Data display Bar at the bottom right of the screen.

Layers

Selecting the first menu item, Layers, will bring up a dialog box, Layers Setup, into which you set the parameters for each layer individually.



Layer:

The left section of the dialog box is the layer listing window. The initial layer in a new document will be named 'Untitled'.

Rename:

When a layer is selected in the listing window, its name may be changed in the 'Rename:' box by typing on the keyboard. A layer name is limited to 20 characters.

When there are more layers than can be shown in the listing window, the scroll bars on the right of the listing window become active to allow scrolling through the list.

New:

At the bottom left of the Layer setup dialog box is a 'New' button. To add more layers to the list click this button. Each new layer is selected in the list window and is given the name 'Untitled'.

Remove:

The Remove button next to the New button will remove whichever layer is selected in the layers list after first asking the user 'are you sure'. When a layer is removed from the list, all objects in that layer are deleted from the document.

Move:

There are four buttons under 'Move' which will change the position of a layer in the list.

Top: Sends the highlighted layer to the top of the listing.

Up: Moves the highlighted layer up one level in the listing.

Down: Moves the highlighted layer down one level in the listing.

Bottom: Sends the highlighted layer to the bottom of the listing.

A layer will always keep its assigned name regardless of its position in the layer list. The position of layers in the list also determines how they are displayed. Objects in upper layers may have fill patterns that block objects in lower layers from being seen.

Active

The Active button will display a black circle inside it when the layer selected in the layer list is the active layer.

The Active layer being:

- the layer the user was working in prior to entering the Layer dialog box
- last New layer created after entering the Layer dialog box
- last layer made active by selecting it in the layer list and clicking the Active button.

Layer Visibility

A layer's visibility may be set to:

- Normal
All objects in the layer may be seen and selected from other layers. Places a black diamond in front of the layer name in the layer list.
- Grayed
Objects in layer are seen as grayed outlines from other layers. A Hollow Diamond is placed in front of the layer name in the listing. Text and fills are invisible in grayed layers.
- Invisible
All objects in layer may only be seen when the layer is active. No marker is placed in layer list.

Layers not displayed are not plotted or printed. Layers displayed as grayed will print grayed but no text or fills will print. This ability to view any number and variety of a document's layers has many advantages.

Command Key Equivalents

While in the Layer Setup dialog box, the following commands may be used.

Command	Function in Layers	Normal Function
⌘ A	Activate Layer	Select All
⌘ B	Send Layer to Bottom	Send to Back
⌘ D	Send Layer Down One Level	Duplicate
⌘ G	Gray Out Layer	Group
⌘ I	Make Layer Invisible	Intersect
⌘ N	Create New Layer	Create New File
⌘ R	Remove Layer	Reshape
⌘ S	Set Scale	Save
⌘ T	Send Layer to Top	Trim
⌘ U	Send Layer Up One Level	Ungroup
⌘ Space	Make Layer Normal	None

Scale...

Each layer may have a different paper scale. To scale a layer, select the layer in the listing and click the Scale button in the Layers Setup dialog box.

The Scale dialog box which appears is the same dialog box that appears when selecting scale in the Page menu. See Scale in the Page menu chapter for information on the Scale dialog box.

Colors...

The color selections available when selecting this layer option depends upon the type of equipment you are using. Colors set in the Layer Setup dialog box will be seen on screen and available to printers only if 'Use Layer Colors' menu item in the Colors menu is selected.

With the Color button you may assign colors to your Layers. Any monitor or card giving 16 colors or fewer is limited to the eight color selections which appear on color printers or plotters. However, if the user is working on a Macintosh II with 256 colors the color palette can be used.

The colors from the standard system palette are the only colors used; thus the program can keep conformity throughout its environments. For more detailed information on when layer colors are used and definitions of fill and pen, foreground and background colors, see the Color chapter.

Set Up

For 256 colors

Before choosing the Layers Setup dialog.

- Choose the Control Panel under the Apple menu.
- Choose the Monitor icon and select Black & White/Grays or Color according to your monitor type. Then set the number of colors or grays to 256 (available only if you have 8-bit-deep video memory).
- Click on the Colors... button and the Show Colors dialog will open.
- Click on the Set Color... button for the layer color you want to set (fill/pen, foreground/background), and the color palette will appear.
- From the color palette you may select from the 256 system colors.

16 colors or less

- Click on the Colors button and the Show Colors menu will open.
- Click on the Color name for the layer color you want to set (fill/pen, foreground/background), and a pop up color menu will appear.
- From the color menu you may choose the color to represent the color selection you just made.

The Transfer Mode

✓Paint
Overlay
Invert
Erase
Not Paint
Not Overlay
Not Invert
Not Erase

The Transfer Mode selection area is below the Color button. This pop-up menu gives the user the ability to select one of eight visual attributes that will apply to the objects that are drawn on that layer.

Transfer modes are not supported on postscript printers and plotters.

Paint Paint gives objects an opacity so that you cannot see through into lower layers.

Overlay Overlay gives objects a transparent effect so that you can see through them into lower layers.

Invert Invert will give objects a photo negative effect. Thus, if you lay a white object in one layer over part of a black object in another layer and click Invert, the covered portion of the black object will appear white. If you layer a diagonal striped box over a black box and click Invert, the stripes that are over the black box will appear to have switched color. The white stripes become black and the black stripes become white.

Erase Erase will give objects a transparent effect so that you can see through them into lower layers. However, the object in your active layer will draw all foreground patterns as white and background patterns as none (*none* is a transparent fill pattern found under the Fill menu). The background does not default to black under normal circumstances.

Not Paint

Not Paint will give objects an opacity and will additionally invert the colors. With black and white colors, (the pen foreground being black), the pen foreground will become white.

Not Overlay

Not Overlay will give objects a transparent effect so that you will be able to see through them into lower layers. At the same time, it will invert the colors. If the colors are black and white with the pen foreground being black, the pen will become white.

Not Invert

Not Invert will give objects a transparent effect so that you will be able to see through them into lower layers. This mode will also make the object in your active layer look as if all the black diagonal lines are white and transparent. Where a stripe overlaps a black pixel from another layer, the pixel will turn white. The white diagonal stripes or background color of the object will default to None, ie., an invisible pattern.

Not Erase

Not Erase will give objects a transparent effect so that you will be able to see through them into lower layers. This mode will also make the object in your active layer look as if all background patterns (the white stripes) are white and foreground patterns (the black stripes) are None (invisible fill pattern).

et Layer

Set Layer displays a popout menu of the layer list. To the left of each layer name is the visibility marker.

- **Black Diamond**
Layers are set to Normal.
- **Hollow Diamond**
Layers are set to Grayed.
- **No Marker**
Layers are set Invisible.
- **Checkmark**
Active layer does not display visibility marker.

Selecting Layers

To move from layer to layer either:

- Select the layer you want from == menu: Set Layer popup list
- Select the layer from the Data Display Bar popup list activated by clicking on the Layer Name in the data bar
- Hold down the Command key and press the Arrow Up or Arrow Down keys

ayer Options

- | |
|--|
| Active Only |
| <input checked="" type="checkbox"/> Gray Others |
| Show Others |
| Show/Snap Others |
| Show/Snap/Modify Others |

The selection of this menu item brings up a dialog box from which the user may set how to work with other layers. The checkmark indicates the current selection. Layer Options will not change any of the individual setting made in the Layer dialog box.

Active Only

This selection will only display the Active layer on the screen.

Gray Others

This grays all layers that have been set Normal except the Active layer.

Show Others

All layers that have been set to Normal or Grayed may be seen from the active layer as they were created (Normal or Grayed).

Show / Snap Others

All layers that have been set to Normal or Grayed may be seen from the active layer as they were created (Normal or Grayed).

Objects in Normal layers may be snapped to through the layers if the layers are of the same scale..

Show / Snap / Modify Others

All layers that have been set to Normal or Grayed may be seen from the active layer as they were created (Normal or Grayed).

Objects in Normal layers may be snapped to through the layers and those objects may be edited from the Active layer if the layers are the same scale.

Note; The selection handles of object on the active layer are black. Objects selected but on other layers have hollow handles. Locked objects have grayed handles.

Group

(⌘ G)

Instead of trying to move several objects around the screen at the same time, it may be more advantageous to combine them into a Group for easier handling. Any number of graphic objects, text, or symbols, may be selected and combined into a Group. Groups may be selected along with other objects and combined into another group. A Group is created by selecting all the objects and or text that you wish to combine into a group and select Group from the menu.

Every object when selected displays selection handles. There is only one set of handles for a Group no matter how many objects are in the group.

However, every object in the group retains its own snap points. So no matter how large the group, it may be moved and snapped to any point on the screen by one of the snap points of its objects.

Groups may be several levels deep. Combining groups into group creates levels within the group. If a Group has three levels of groups within it, it will take three levels of ungrouping to break it back down to basic objects.

Ungroup

(⌘ U)

The Ungroup command breaks the selected groups apart into their constituent parts. If a Group is a combination of other groups it may be necessary to ungroup several times before getting to the individual objects that were placed into the group.

Enter Group

This menu has three functions:

- Edit objects within a Group without breaking the group apart.
- Edit a Symbol that is selected on screen.
- Edit 3D objects by taking the object back to its 2D origin for the edit.

Selecting a group and then selecting Enter Group will take you one level deep within the group. All other objects in the drawing will not display.

To go deeper into subsets of groups select Enter Group again and continue to open the group that you want to edit.

Editing a Symbol with Enter Group is similar to selecting Edit Symbol found later in this chapter. Edit Symbol brings up a dialog to select the symbol from the library to be edited. With Enter Group you select a symbol on the drawing and edit it and then use Exit Group to return to the drawing window.

See the 3D section in the Δ menu chapter for editing 3D objects .

Exit Group

This does the reverse of Enter group. When the object is edited, you need to Exit Group as many times as you entered groups to put the groups back together.

When a symbol is edited the edit changes the symbol in the library and all instances of the symbol placed on the drawing.

Top Level

A faster way to exit out of groups of several levels and get back to the Top Level on the drawing is to select this instead of Exit Group.

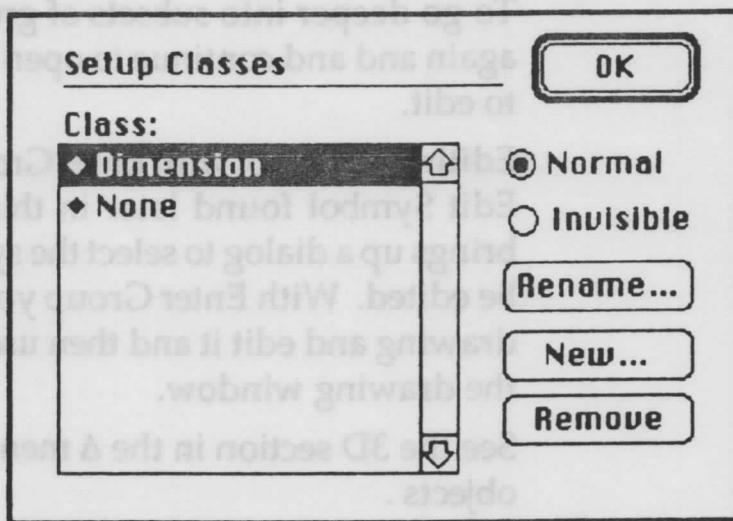
Classes...

Placing an object into a class allows:

- Changing its visibility for screen display and printout.
- Setting specific criteria for use with commands and worksheets.

The Classes dialog box is for the creation, deletion, and manipulation of visual attributes of the class listing.

Assigning objects to Classes is done in the Data Palette.



In the Class List there are two predefined classes: None and Dimension. The program defaults to place all drawn objects into the None class . All dimensioning is placed into the Dimension class. Both classes, None and Dimension, default to a visual setting of normal.

Creating a New Class

Click the New button and a dialog appears prompting you to type in a name for the new class. Class names are restricted to twenty characters. Either type a name and click the OK button or click the Cancel button to get back to the Setup Classes dialog box.

Setting Class visibility

All new classes will be listed and will default to Normal. To change the visibility of a class select it in the listing and click the button denoting the change.

When a class is selected in the class list, its visibility selection button will have a black circle inside it.

Normal

All objects in classes with this setting may be edited and displayed without restrictions.

Invisible

All objects in classes with this setting will be hidden from view and may not be edited.

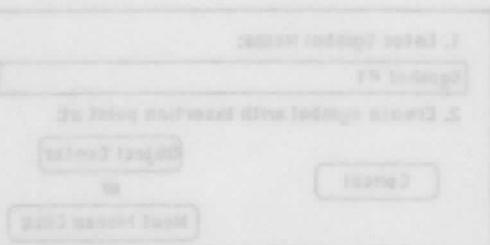
Markers

To indicate the settings in the class list a diamond marker is placed to the left of the class name

If a Class in the list does not have a Diamond marker to its left it has been set to Invisible.

Renaming Classes

Select the class in the class listing and click on the Rename button. A dialog box will appear allowing you to type a new name. Either type a new name and click the OK button or click the cancel button to return to the Setup Classes dialog box.



Symbols

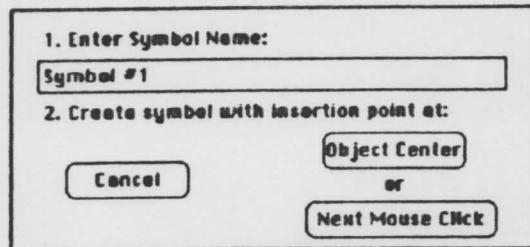
A Symbol is a special object in this program.

- Any objects and text may be converted into a symbol.
- A Symbol is given a name when created.
- Symbols are placed into a library.
- Each file may have one Symbol Library.
- Symbol libraries may contain folders.
- Symbols and folders may be moved around in the library.
- Symbol libraries may be accessed whether the file they are in is open or closed.
- The symbols selected in the symbol library may be inserted into a drawing with the Symbol Insertion tool by clicking the mouse.
- The point of insertion of a symbol is determined when it is created.
- Symbols in the drawing may be placed in Edit mode with Enter Group in the = = menu.
- Symbols in the library may be placed in Edit mode by clicking the Edit Symbol button.
- After the symbol has been edited, select Exit group in the = = menu to return to the drawing window.
- All instances of a symbol are globally changed when a symbol is edited.
- Records may be attached to symbols.
- Text within a symbol may be linked to a record.

Create Symbol...

Select any objects and select Create Symbol from the menu. The dialog box that appears asks you to perform two functions.

- Give the symbol a name.
- Determine the point of insertion for the symbol



If you fail to type in a name the program will give it the default name found in the input box.

Setting Insertion Point

Symbol #1

Once a name has been typed, you click one of the two buttons below to create the symbol and place it in the library.

Object Center

Clicking the Object Center button will create the symbol with its X - Y center as the insertion point. You will be returned to the drawing window. The objects that were

2. Create symbol with insertion point at:

Object Center

Cancel

or

Next Mouse Click

used to create the symbol are no longer in the drawing window. They have been placed into the symbol library.

Next Mouse Click

Clicking the Next Mouse Click button will return you to the drawing with the objects still selected and waiting for you to click the mouse button to set the insertion point. Using the Constraint tools and Data Display Bar, the cursor may be snapped to a specific point of the objects that are to be created into the symbol.

When the mouse button is clicked in the drawing window, the point of cursor snap will be the insertion point of the symbol. The objects that were used to create the symbol are removed from the drawing window. They have been placed into the symbol library.

Cancel

Clicking the Cancel button will return you to the drawing with the objects still selected. The Create Symbol command will be cancelled.

Select Symbol...

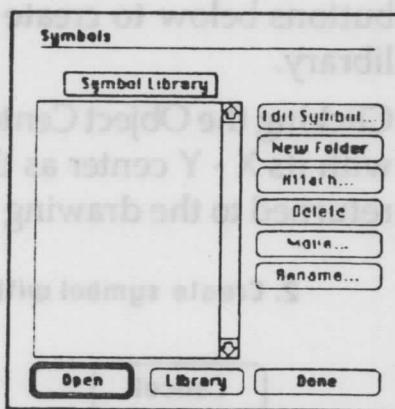


Symbol Insertion Tool

There are two ways to gain access to the Symbol Library:

- Select 'Select Symbol' from the == menu
- Double-click on the Symbol Insertion Tool

The Symbol Library dialog box will appear using either method.



Symbol Library

This dialog box contains:

Symbol Library .

The symbols may be individually listed or may be placed into folders with folders inside folders. This popup menu lets the users determine how deep into the folders to search for symbols.

Open Button

To place a symbol from the list to the drawing, select the symbol then click the Open or Done button. This takes you back to the drawing. With the Symbol Insertion tool selected, click the mouse when the cursor is at the point you want to place the symbol.

Library Button

If other MiniCad+3.0 files are open, clicking this button will take you from one library to the next. To select a symbol from one of those libraries, first select the symbol then click the Open button. You will be returned to the current drawing with the symbol copied to the file's library and selected for placement.

If no other files are open or you have traversed the open

files by clicking the Library button, a search dialog appears through which you may search any and all drives available to you to select a closed file.

When a closed file is selected, the library dialog box will return with that files listing of symbols and folders. Select the symbol you want and select the Open button. This will copy the symbol to the symbol library of the current file and the symbol will be selected in the library for insertion on the drawing.

Done Button

This closes the library and returns you to the drawing with the currently selected symbol becoming the active symbol.

Edit Symbol Button

Once a symbol is in the library it may be edited. Select a symbol in the library list and select this button.

The Edit mode selected here is the same as selecting Enter Group when a symbol is selected on the drawing. The Edit mode screen will show a large crosshair. The center of the crosshair is the insertion point of the symbol. The objects or text in the symbol may be edited in any fashion.

When the edit of the symbol is complete, select Exit Group from the == menu to return to the drawing. All instances of the edited symbol in the drawing will reflect the changes.

Enter Group

If you wish to edit a symbol that has already been placed on the drawing, it is not necessary to select the symbol from the library. A symbol on the drawing may be edited by selecting the symbol then choosing Enter Group from the == menu.

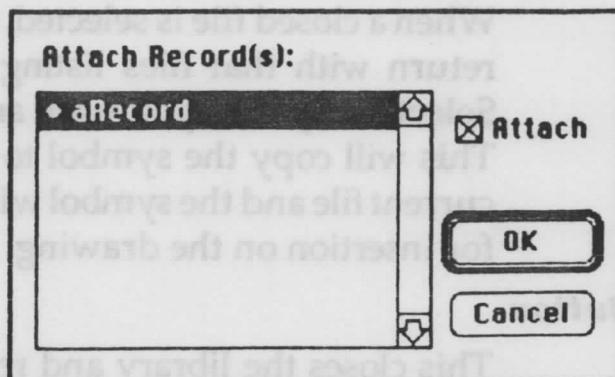
After the edit is complete select Exit Group to return to the drawing with all instances of the symbol edited.

New Folder

This button creates a new folder and will bring up a dialog box in which you give the folder a name.

Attach...

A dialog appears allowing you to attach records to the symbol selected in the library list.



Attach Box

To Attach a record to the symbol, select the record and click on the Attach box to place an X in it.

If the Attach box displays an X when a record is selected, it means the record is already attached to the symbol.

To remove a record from a symbol, select the record and then click on the Attach box to remove the X.

Only instances of the symbol placed after attaching the record(s) will be assigned the record(s). This is not a global change.

OK

Clicking the OK button will set any changes made and return you to the Symbol Library dialog box.

Cancel

Clicking this button will return you to the Symbol Library without any changes being made.

Enter Group or Edit symbol may also be used to attach records to symbols. Once in the Edit mode, assign records to the symbol the same as you would assign them to objects, through the Data Palette. Exit Group when you are finished the symbol edit.

Delete

Will delete the symbol or folder selected in the library list from the drawing. This will delete all instances of the symbol from the drawing.

Move...

This button allows the user to move the symbols and/or folders around within the Symbol Library. Select the symbols or folders to be moved then click the Move button. The dialog that appears will show folders that exist in the library. Select a folder then click the Open button. Clicking the Ok button will place what you are moving onto the folder.

Rename

Brings up a dialog for editing the name of the selected symbol or folder.

Symbol to Group

Editing a symbol will globally edit all instances of that symbol. To change one instance of a symbol, select it then select Symbol to Group. The symbol instance is removed from the symbol list and converted to a Group of objects.

After the Group is edited you may wish to create a new symbol with a new name from it.

Link Text to Record

This menu item will link text in a symbol to the field of a record. This makes it easy to edit a field to change the symbol flag.

Select a symbol instance on the drawing and a block of text. Select Link Text to Record. In the dialog box that appears select the record and field you want to tie the text in the symbol to. Click the OK button.

The symbol will appear with the original text in it. Select the symbol, select the record and field in the Data Palette, then edit the field in the Data Palette. Deselecting the symbol will change the text to the edit of the field done in the Data Palette.

You can also link text to a record while in the Enter Group mode using the data palette.

Text Menu

8.1 Font

8.2 Size

8.3 Style

8.3 Left

8.3 Center

8.3 Right

8.4 Single Space

8.4 1- 1/2 Space

8.4 Double Space

8.4 lower case

8.4 UPPER CASE

8.4 Title Caps

Text Menu Popup Menus

8.1 Font

Avant Garde
Bookman
Chicago
Courier
✓Geneva
Helvetica
Monaco
N Helvetica Narrow
New Century Schlbk
New York
Palatino
Symbol
Times
Venice
Zapf Chancery
Zapf Dingbats

8.2 Size

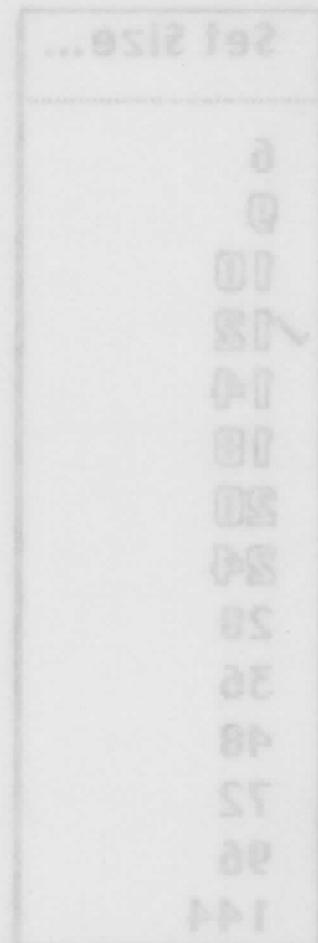
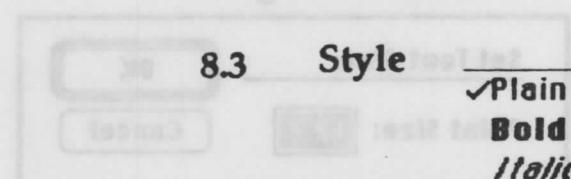
Set Size...

♦ 6
9
10
12
14
18
20
24
28
36
48
72
96
144

and go back to 2. Is 2.

8.3 Style

✓Plain Text
Bold
Italic
Underline
Outline
Shadow



Introduction

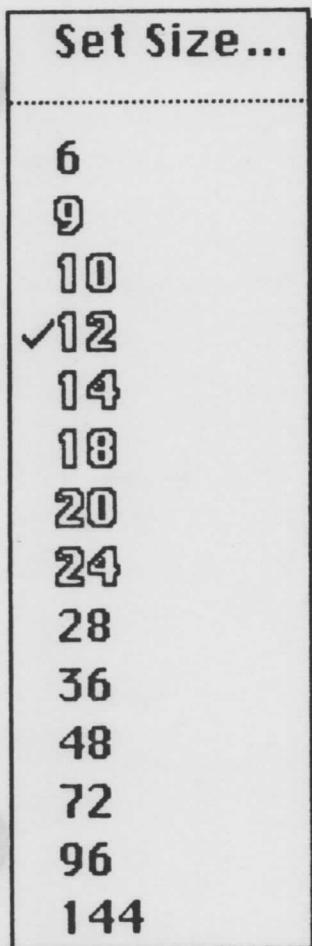
Text may be entered and edited at any scale or zoom factor. The text size is determined by point size set in the menu. Rotation of text is available in integer degrees. Importation of text from other applications is through the Clipboard. Fonts are dependent upon what is accessible from the user's system.

The I-Beam cursor is used to place and edit text in drawings.

Font

The default font is Geneva. You may change the fonts at any time during drawing by selecting the font before entering text or selecting the text in the drawing, then selecting a font under this menu.

Size



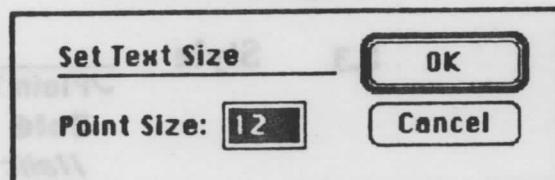
Point sizes may be changed any time during drawing by selecting the text on the screen with the selection cursor and then selecting a Point size under this menu. Selecting Set Size allows input of sizes not shown here.

✓
Indicates both Text
and Markers are same
point size

T
Indicates Text point
size

◆
Indicates Marker point
size

Set Size dialog box



There are three types of cursors that may be seen on the Size menu:

Editing Text

There are two cursors to edit text.

- Select the text with the Arrow cursor which allows:
 1. Changing fonts, point size, style, alignment, and case.
 2. Changing background fill pattern by selecting a new fill pattern.
- Select the T icon in the Palette, then highlight the text with the text cursor or place the text cursor in the text to perform the edit. This allows:
 1. Editing of actual text.
 2. Changing fonts, point size, style, alignment, and case.

Changing the font, size, style, alignment, or case of one letter of a text block will change all text in the block.

Text Size

Font, Dimension, and Marker sizes may be selected from the predefined sizes or by selecting Set Size and typing in the point size. To change Marker sizes, hold down the Option key prior to selecting or setting a size.

Point size is set for printout and is independent of Paper Scale. Three layers of different scale but all with text at 12 point will print all text at 12 point. When rescaling a layer, click the Scale Text box to maintain the point size of text or it will change proportionally with the scaling. Zooming in or out will also zoom text.

Importing Text

Text may be imported through the Clipboard from other applications. All line breaks must have a carriage return for MiniCad+ to recognize the end of a line. Individual text may be edited as above. If sections of the import are to have different fonts or sizes they should be brought in separately through the Clipboard.

Rotating Text

Text may be rotated to any integer degree using the Rotate pop-up menus under the Δ menu. This text is still editable:

Simply click on the text with the text cursor and the text will temporarily straighten. Make the correction, then click outside the text anywhere on the drawing, and it will return to its last rotation.

Rotated Text

1 13/16"

Style

The style of type face may be changed during drawing by selecting the text on the screen with the selection cursor and then selecting a style under the Text menu. You may select a single style or a combination to build multiple styles.

Plain Text
Bold
 Italic
Underline
Outline
Shadow

..... PlainText
..... Bold Text
..... Italic Text
..... Underline Text
..... Outline Text
..... Shadow Text

This text is a combination of bold italic and underline

Alignment

The alignment of text may be changed at any time during drawing by selecting the text on the screen with the selection cursor and then selecting an alignment under this menu.

Left
Center
Right

Align Left

Align Center

Align Right

Leading

The space between lines of text (leading) may be changed during drawing by selecting the text on the screen with the selection cursor and then selecting an alignment under the Text menu.

Single Space
 1 1/2 Space
 Double Space

A sample of Single Spaced lines. Notice the leading.

A sample of 1 1/2 Space lines. Notice the leading.

A sample of Double Spaced lines. Notice the leading.

Case

Case styles may also be changed during drawing to one of the three selections by selecting the text on the screen with the selection cursor and then selecting a case style under this menu.

lower case
UPPER CASE
Title Caps

this is minicad+ 3.0

THIS IS MINICAD+3.0

This IsMiniCad+ 3.0

Page Menu

Commands

- | | | |
|------------|--------------|---------------------------|
| ⌘ 3 | 9.1 | Normal Scale |
| ⌘ 4 | 9.1 | Fit To Window |
| | 9.2 | Save View... |
| ⌘ 7 | 9.2 | Snap to Locus |
| ⌘ 8 | 9.2 | Set Grid... |
| ⌘ 9 | 9.4 | Set Origin |
| | 9.5 | Scale... |
| | 9.7 | Units... |
| | 9.8 | Drawing Size... |
| | 9.9 | Tablet |
| | 9.100 | Thin Lines |
| | 9.100 | Tool Palette |
| | 9.100 | Constraint Palette |
| | 9.100 | Data Palette |

Menu

Option Menu

Shift Drawing 9.4

**Three Cases
Number Cases
Upper Case**

(C)

To answer the question of how many bytes to fit on a page, we must first determine how many bytes are available. This is determined by the number of columns and rows in the page header. Since the column size of the better way to display a page is one byte, the number of bytes available is the product of the number of columns and the number of rows.

(C)

Place the entire drawing, along with its title block, within the current window of the application (or the editor) to the extent of the window.

Moving Around the Screen

Moving from left to right within the window is done by selecting the scroll bar and dragging it to the right or left. To move up and down within the window, select the scroll bar and drag it up or down. To move from one window to another, click on the window you want to move to, then click on the scroll bar and drag it to the right or left.

Moving Scale (W 3)

To move an entire layer to the center of a page or drawing, select the layer (W 3), then click on the scroll bar and drag it up or down. This will move the entire layer to the center of the drawing.

If it is necessary to move to the center of a drawing, hold down the Control key (C) and A, then press the scroll bar and drag it up or down. This will move the entire drawing to the center of the screen.

Normal Scale

(⌘ 3)

To view or edit a drawing at the same size it would print, select the Normal Scale menu item. In a 1:1 scale, one square inch of screen area would display a one inch square and would print a one inch square. In a 1:48 scale, one inch of screen area would display a forty-eight inch square and would print a one inch square representing a 48 inch square. Since the actual size of the paper may be larger than the screen, it is necessary to move the screen display to view all the areas of the drawing.

Fit to Window

(⌘ 4)

Places the entire drawing, even multiple pages, within the drawing window of the screen, with the center of the page(s) at the center of the screen.

Moving Around the Screen

Normal Scale and Fit to Window are very helpful when wanting to go to areas of the drawing quickly and easily.

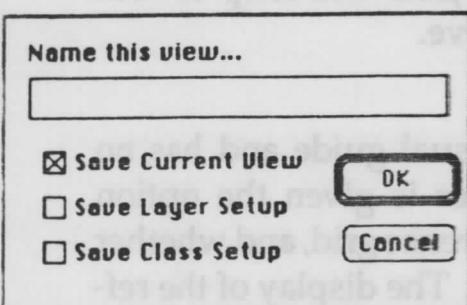
When an object is selected and then Normal Scale is selected (or its equivalent, ⌘ 3), the object is placed in the center of the drawing window. Moving from one area of a large drawing to another may be done quickly by first selecting Fit to Window (⌘ 4), selecting an object in the area in which you wish to move to, and then selecting Normal Scale (⌘ 3).

To move an entire layer to the center of a page or drawing select Fit to Window (⌘ 4), select all the objects in the layer (⌘ A), cut the objects from the drawing (⌘ X), then Paste (⌘ V). This is helpful when moving imported PICT files that offset to the lower right of the drawing.

It is not necessary to wait for the screen to redraw each time a Command key is used. Holding down the Command key (⌘), then hitting 4, A, X, and V in succession will speed up this process. The screen will not redraw until the series of commands is finished.

Sav View...

When selecting this menu item a dialog box will appear prompting the user to type a name for the view. Either type in a name and click the OK button or click the Cancel button to return to the drawing.



The boxes below the name allow you to decide whether you want to save the layer and class visibility setups with the views so it is not necessary to reset layer and class visibilities each time you go to a saved view.

When you wish to go to a saved view, double click on the command with the name of the view you want.

If the command palette that stored the view was closed, it may be reopened by selecting it from the Command dialog box in the **⌘** menu.

The commands for Save View may be edited from the Command dialog box. See Commands in the **⌘** menu.

Snap to Locus

(**⌘** 7)

Any locus, once placed in the drawing area, may be snapped to with Snap to Objects on. The Snap to Locus command creates a horizontal and vertical line from each locus in the active layer. While drawing, dragging, or reshaping objects, the cursor will snap to the nearest point on the line if it is clicked within the snap radius of the locus line. (See Preferences for setting Snap Radius)

Set Grid

(**⌘** 8)

The Set Grid dialog box may be activated by:

- Selecting Set Grid from the Page menu.
- Holding down the Command key and type 8.
- Double-click on the Snap to Grid icon in the Constraint Palette.

Snap Grid

The smallest unit increment to which the cursor will snap. This grid is displayed as points on the screen when in a zoom that would allow them to be seen. The Snap

Grid may be changed at any time during the drawing to coincide with the level of detail the user desires. The cursor snap aids in creating precise measurements. For example, if the user wants exact feet with no rounding or fractions, the Snap Grid should be set to 1'. When drawing with the mouse, all objects will snap to foot increments if Snap to Grid is active.

Reference Grid

The Reference Grid is only a visual guide and has no effect on the drawing. The user is given the option whether or not to display the reference grid, and whether or not to print the reference grid. The display of the reference grid (assuming it is set to be visible) will be automatically suppressed if its display would blacken the entire drawing. Suppression of the display most often occurs when zooming out on the drawing. Setting the Reference Grid to a multiple of the Snap Grid will allow snapping at the reference grid intersections.

Double Line Separation

The Set Grid dialog box is also used to set the spacing for double-lines, and determine whether they will draw as lines only, polygons only, or both polygons and lines.

This portion of the dialog box is broken up into three parts:

Create Lines:

If only this option is selected then double lines will be created as lines only.

Create Polygons:

If only this option is selected then double lines tools will create closed polygons.

Both Create Lines and Create Polygons

If both options are selected then the double line tools will create double lines as lines with invisible polygons which may be assigned fill patterns.

Double-Line Separation

The distance for the offset of double lines is placed in the data entry box.

Set Origin

(8 9)

The coordinate origin is the point on the drawing where the zero value on the X axis meets the zero value on the Y axis. This is the center of the coordinate system, and it is normally in the center of the sheet. If the sheet size is changed, the fixed coordinate system remains centered on the sheet.

Sometimes the user wishes to know not the distance from the coordinate origin, but rather the distance from a particular point on the drawing. The user may move the coordinate system so that an origin for measurement purposes can be set wherever the user desires. Changing the coordinate system doesn't change the drawing, but moves the X, Y center to another location in the drawing. The user resets the origin numbering point by the following steps:

- Select Set Origin from the Page menu. This presents the user with a Bullseye cursor.
- Move the cursor to the point to be set as the new origin. Click the mouse button.

Shift Drawing

Holding down the Option key prior to selecting from the Page menu will change the Set Origin menu item to Shift Drawing. This menu item is used to move the entire drawing around the page.

If all layers were set Normal then a Select All could be used to move the entire drawing. Usually there are several layers that are invisible or grayed so a Select All would have no effect on the entire drawing.

- Pick a point on an object in the drawing that you would like to move .
- Choose Set Origin and click the Bullseye cursor on the point to change it to 0x , 0y. This point will be used to set the offset of the next procedure and move the entire drawing accordingly.
- Choose Set Origin again while holding down the Option key. This displays a new cursor called the Compass cursor.

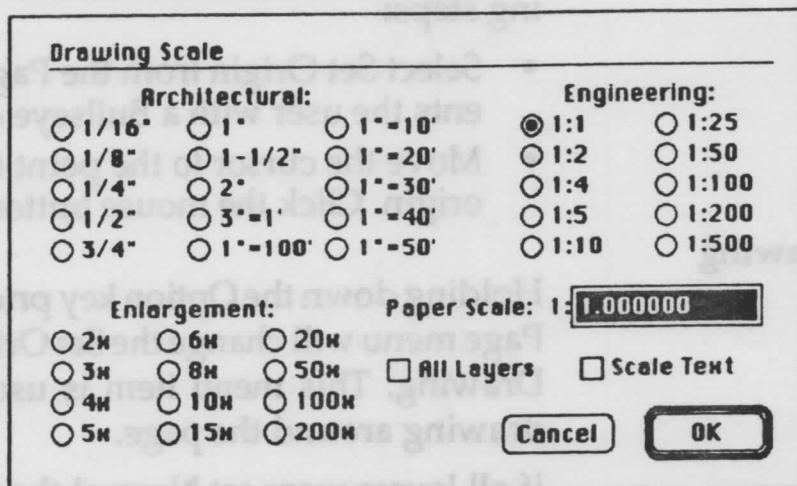
- Click the compass cursor on the drawing where you want the point on the object to move to.

Scale...

Paper scale may be set either in this menu or in the **==:Layers** menu item. Scale may be set for one or all layers in both menu items.

The dialog box is divided up into several sections reviewed below:

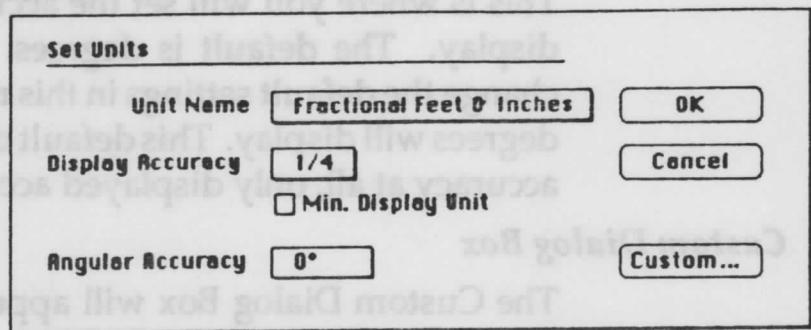
- The Architectural and Engineering sections have buttons that when clicked place a scale in the Paper Scale data entry box.
- Any scale may be typed into the Paper Scale data entry box.
- The Enlargement choices act as multipliers. With a 2X enlargement, it would increase the size 200% or 2 times n. Therefore if n is equal to 2", a 2X selection would result in a 4" measure. A 4X selection would result in a 8" measure.



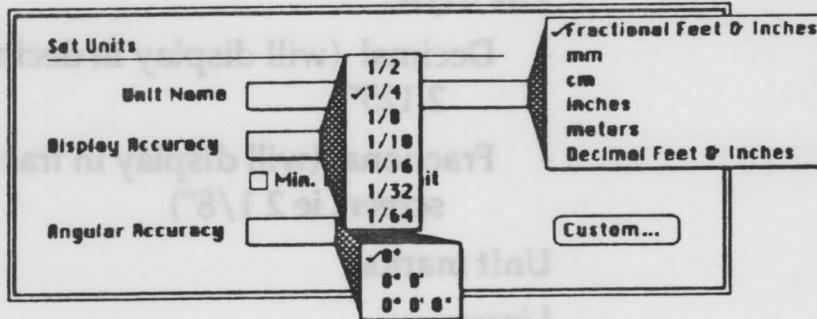
- The paper scale represents the display scale of your current drawing area. If you had selected an 8" x 10" drawing area to work on and then set your paper scale to .5 under the scale dialog box, you would now be working on a 4" x 5" drawing area in scale.
- The All Layers check box will set all the layers created in the layer menu to the current user selection made under the scale menu.
(Note: this could alter your drawing.)
- Scale Text will allow text to scale with your drawing as you change the scale of that drawing.

Units

The Set Units dialog box allows the user to set Unit Name, Display Accuracy, Angular Accuracy, and / or to customize the settings further through clicking on the Custom button.



Unit Dialog Box Pop-Up Menus



Unit Name

Clicking on the Unit Name Pop-Up Menu selection box allows selection of drawing units.

Display Accuracy

The unit increment or Display Accuracy must then be set.

- If the user chooses Fractional Feet & Inches, the default will come up 1/8". The user may define a higher accuracy such as 1/64" by clicking in the Display Accuracy box which will prompt a pop-up menu from which a variety of accuracy settings may be selected.
- If the user had chosen anything other than Fractional Feet & Inches in the Unit Name, then Display Accuracy would be used as a pull down menu from which up to nine decimal place accuracy might be chosen .

Min. Display Unit Box

This box only appears when selecting fractional feet and inches. It allows you to set the minimum display of the Data Display Dar and Dimensions.

Angular Accuracy

This is where you will set the accuracy for any angular display. The default is degrees. If the user does not change the default settings in this menu then only whole degrees will display. This default does not affect angular accuracy at all, only displayed accuracy.

Custom Dialog Box

The Custom Dialog Box will appear when the Custom Button is selected.

The Style:

- Decimal (will display in decimal on the screen, ie 2.125")
- Fractional (will display in fractional units on the screen, ie 2 1/8")

Unit marks:

Linear:

This is the string of text that normally displays after numbers, it may be up to eight characters long.

Square:

This is the string of text that will appear in area calculations it may be up to twelve characters long.

Accuracy:

Stored:

This defines the smallest unit stored and ultimately sets the overall accuracy of the drawing. When using decimal set this number to end in zeros (ex 10000). When setting the custom to fractions set it to a power of 2(2, 4, 8, 16,... 4096). It is important to note that changing this value will re-structure the entire drawing space and may affect the drawing.

Displayed:

This field allows the user to set the minimum displayed unit. The minimum display will determine the readouts in the Data Display Bay and Dimensioning.

Units Per Inch:

This field is necessary for users who need units that are not available on the standard units menu. To use decimeters as the base unit in the drawing enter 0.2540 into this box since there are 0.2540 decimeters to an inch.

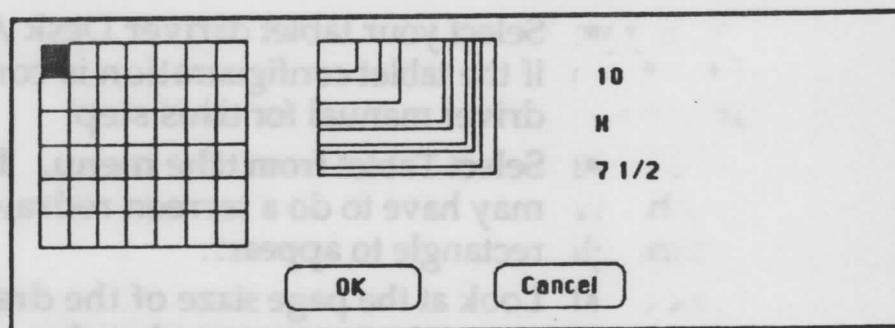
Defaults:

This button will return you to the 'Units' dialog box.

Drawing size...

The left portion of the dialog box displays a matrix of forty-two pages which is the maximum for one document. One tile is selected as a program default indicating that the document is on one page. Always use the matrix on the left for printing.

There are times when you may want to view a document with a larger print area than allowed by the print drivers available in your system. Selecting one of the page overlays will give print sizes up to 48" x 36".



The numbers on the right side of this dialog box indicate the print area allowable from the print driver selected when the page matrix is selected. The numbers show page size when the overlays are selected.

Tablet

If Tablet is selected, the program searches to see if the user has a driver for a digitizing tablet installed in the system. Choosing Tablet will cause the program to look for a tablet driver and link to it. If no driver is found, the program will notify the user.

When a link starts, the program asks the driver for information about the size and resolution of the tablet and will display the tablet on the screen as a large gray rectangle. When the rectangle is present, information from the tablet is scaled directly to the drawing so that high precision digitization can be performed. This information usually is in 200, 400, or 1000 dots per inch, rather than the 72 dots per inch obtained by using the tablet as a mouse.

Using the Tablet

- Step 1 • Set the origin of the drawing to the place where the lower left hand corner of the tablet should be. Example: If the lower left hand corner of the drawing should be at the lower left hand corner of the page, then set the origin at that point.
- Step 2 • Set the scale of the drawing to the scale of the document being traced. It is best to tape the artwork down to the tablet at this time.
- Step 3 • Select your tablet driver Desk Accessory and check if the tablet configuration is correct. See your tablet driver manual for this step.
- Select Tablet from the menu. In some versions, you may have to do a screen redraw in order for the rectangle to appear.
- Look at the page size of the drawing and the tablet rectangle on screen. Are they about the same relative size as a sheet of paper and the tablet you are using? If they are, then proper communication has been set up. If not, go back to Step 2. Two or three tries may be needed to establish a good conversation with the driver.

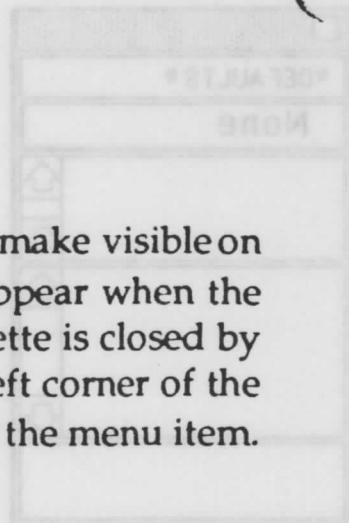
Thin Lines

Zooming in and out will change the thickness of the lines of objects on the screen. Selecting Thin Lines will cause the lines to maintain the thickness they are set to regardless of zoom factors.

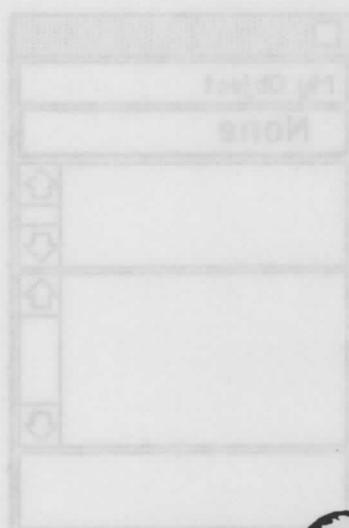
Tool Palette

Constraint Palette

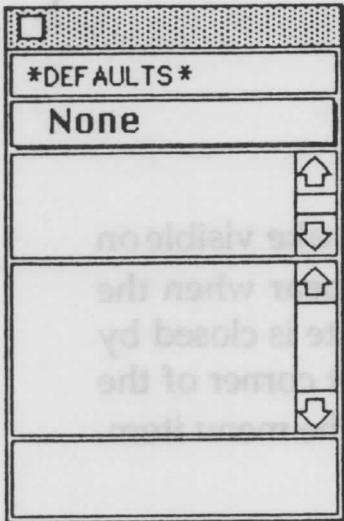
These two menu items are used to open (make visible on the screen) or close the palettes that appear when the program is first launched. If either palette is closed by clicking on its Close Box in the upper left corner of the palette, it may be reopened by selecting the menu item.



Object Manager Bar



Data Palette

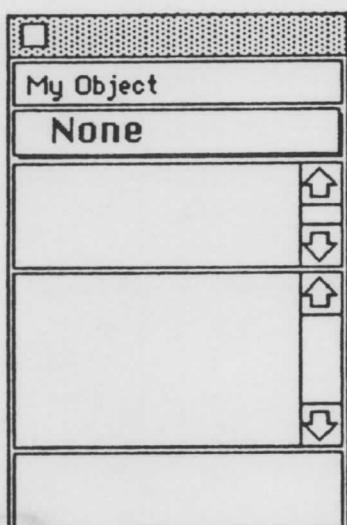


The Data Palette is one of three floating palettes that appear on the screen when the program is first opened. If the palette is removed from the screen by clicking its Close Box in the upper left corner of the palette, it may be brought back to the screen by selecting it in the Page menu.

The Data Palette has five sections:

- Object Name Bar
- Class List and Assignment
- Assigned Record List
- Record List or Assigned Field List
- Field Edit

Object Name Bar



When no objects are selected on the screen, the text *DEFAULTS* is displayed in the bar. If an object is selected on the screen but the object has not been given a name, the bar is blank.

To give an object a name, select the object, move the cursor to the bar and click the mouse button. A blinking text cursor will appear in the bar. Type a name for the selected object.

Each time an object that has a name is selected, its name appears in the Object Name Bar. To change an object's name, select the object, click on its name in the bar, and type in the change.

An Object's Name is specific to that object. The same name can not be given to another object.

Class List and Assignment

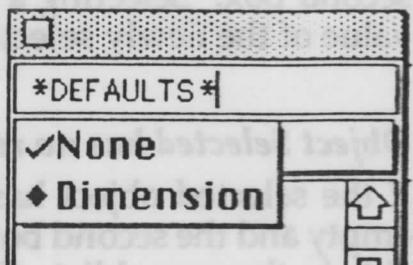
The second box in the Data Palette is the Class List and Assignment box. Here the classes that are created in the = menu are listed and assigned to objects. The assignment of a class to an object is either through selection or default.

Program Classes

The program will open with two classes already defined, Dimension and None. None is the default class into which all drawn objects are placed. All auto-dimensions are placed into class Dimensions. The Data Palette displays None as the default class.

Class List

By moving the cursor to the Class Box and holding down the mouse button, the Data Palette will display the list of all classes in the document.



The class listing will indicate the current default class with a checkmark. The other classes in the list will display a marker indicating their visibility status (see Classes in the = menu).

Class Assignment

An object being drawn will be automatically assigned to the default class. When the program is first opened the default class is None. All objects drawn are placed into that class.

To assign an object to another class, select the object, click the mouse on the Class Box to get the pop-up of all classes, then select the class you want to assign the object to.

Changing the Default Class

When a class name is selected in the Class Box and no objects on the screen are selected, that class becomes the default class and all objects drawn are placed into that class until the default is changed to another class.

Objects in the Default Class are always drawn on the screen whether it is set to Normal or Invisible. Thus, changing the default may change the way the drawing displays and prints.

Records and their Fields

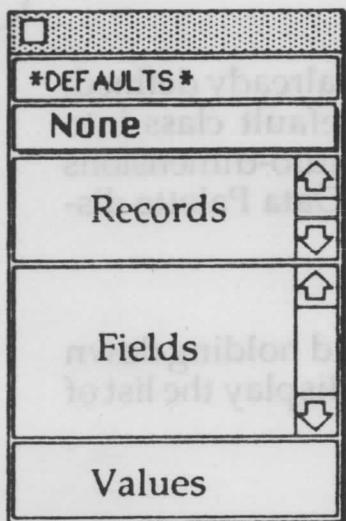
Like classes, records and their fields are created through a dialog box but their assignment to objects is done with the Data Palette. The bottom three boxes in the Data Palette deal with records and fields. How the three boxes display the records and fields is illustrated below.

No objects selected

When no objects are selected in the drawing the records available in the document are listed in the top Record / Field box.

In the second box is a listing of the fields in the record that is selected in the upper box. Selecting a different record in the top box will display the fields of that record in the second box.

In the bottom box is the Value of the selected field in the second box. Selecting a different field will display the value of the newly selected field.

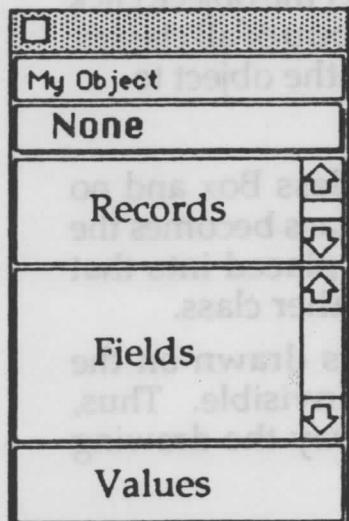


Object Selected has no records

If the selected object has no records, the upper box is empty and the second box will display the records available in the record list. To assign a record to a selected object, double-click on the record.

Classes and Records may be assigned to multiple selected objects the same way as with singularly selected objects. However, the Data Palette will not display the classes and records when more than one object is selected since there is a possibility that objects may have some different assignments and values.

The record then appears in the upper box with its fields in the second box. The field values would be in the bottom box.



Object selected has records

The records assigned to the selected object appear in the top box. Click in an open space in the top box and the second box will change to list all records. Double-clicking on a record will assign it to the selected object.

Clicking in an open space below the list of records will change the second section to list all available records.

△ Menu

Commands		Menu	
⌘ M	10.1	Rotate...	Rotates on Screen
⌘ B	10.3	Move...	Rotates Left 90°
⌘ =	10.4	Send	Rotates Right 90°
⌘ F		(To Front)	Flip Horizontal
⌘ V		(To Back)	Flip Vertical
⌘ -	10.5	Align to Grid	Send Left
⌘ =	10.6	Align Objects	Send Right
	10.9	3D View	Send Backward
	10.12	3D Objects	Send Forward
	10.13	3D Creation	3D View
⌘ E	10.21	(Extrude)	Rotate
	10.26	Preferences	On Screen
	10.26	Lock	Front
		Unlock	Back

Δ Menu Popout Menus

Table P

Rotate...

- 10.1 Rotate
- 10.1 Rotate on Screen
- 10.3 Rotate Left 90°
- 10.3 Rotate Right 90°
- 10.3 Flip Horizontal
- 10.3 Flip Vertical

3D Creation

- 10.13 Extrude
- 10.14 Sweep
- 10.15 Multiple Extrude
- 10.15 Convert To Mesh
- 10.18 Convert to 3D
- 10.18 Render
- 10.19 Set Perspective

Send...

- 10.4 Send to Front
- 10.4 Send to Back
- 10.4 Send Forward
- 10.4 Send Backward

Preferences

- 10.21 Rounded Rectangles
- 10.21 Dimension Offset
- 10.21 Constrain Angle
- 10.22 Snap Radius
- 10.22 Conversion Resolution
- 10.22 Auto-Rotate Dim Text
- 10.22 Click-drag Drawing
- 10.23 Offset Duplications
- 10.23 Full-screen Cursor
- 10.23 Screen Hints
- 10.23 Floating Datum

3D View...

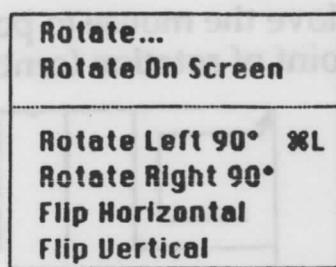
- 10.9 Rotate
- 10.11 On Screen
- 10.11 Front
- 10.11 Back
- 10.11 Left
- 10.11 Right
- 10.11 Top
- 10.11 Bottom

3D Objects...

- 10.12 Rotate
- 10.12 On Screen
- 10.12 Topple Forward
- 10.12 Topple Backward
- 10.12 Swing Right
- 10.12 Swing Left

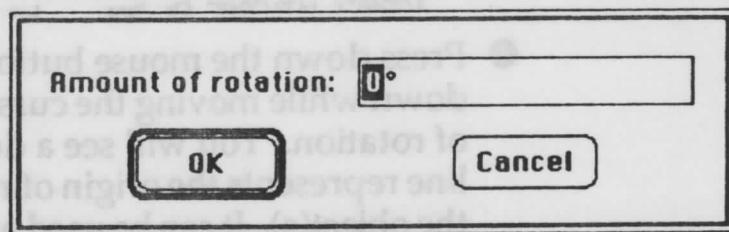
Rotate

There are six pop-up choices for rotation:



Rotate...

When an object is selected and this pop-up option is chosen, a dialog box will appear in which the user may enter the degrees, minutes, and/or seconds of rotation



for the object depending upon the accuracy set in the Units menu item dialog box in Page menu. Text will be rotated in degrees only.

After clicking the OK button, the object reappears, rotated to the specified angle.

Rotate on Screen

By using this pop-up option, an object may be rotated on the screen with the mouse around any centroid with a degree of rotation readout appearing in the Data Display Bar.

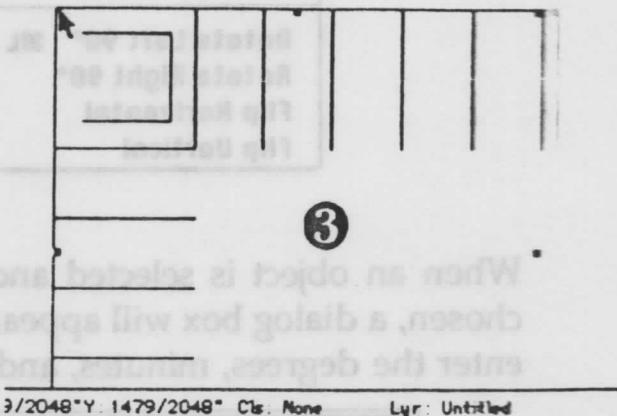
- ① Select object(s).

The selected object is a group of lines and rectangles.



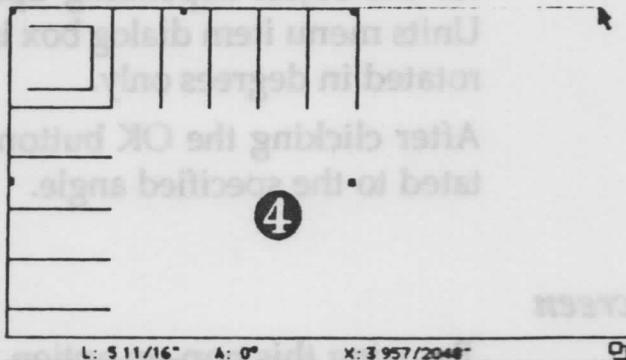
- ② Choose Rotate on Screen pop-up option.
- ③ Move the mouse to position the Arrow cursor at the point of rotation (centroid).

The position of the Arrow cursor when the mouse button is pressed down is the center of rotation.



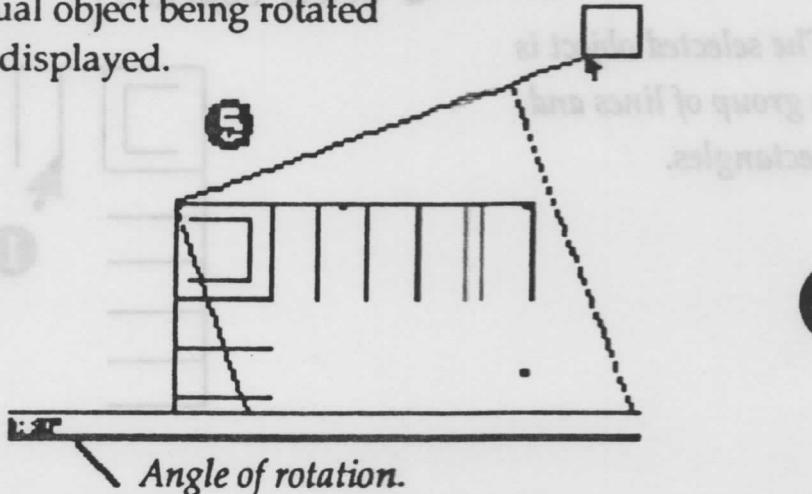
- ④ Press down the mouse button and hold the button down while moving the cursor away from the center of rotation. You will see a dotted line appear. This line represents the origin of rotation and rotates with the object(s). It can be used as a reference line during the rotation

Note, that as the cursor is moved to the right, a dotted line is drawn. It is from this line that the angle of rotation is determined.

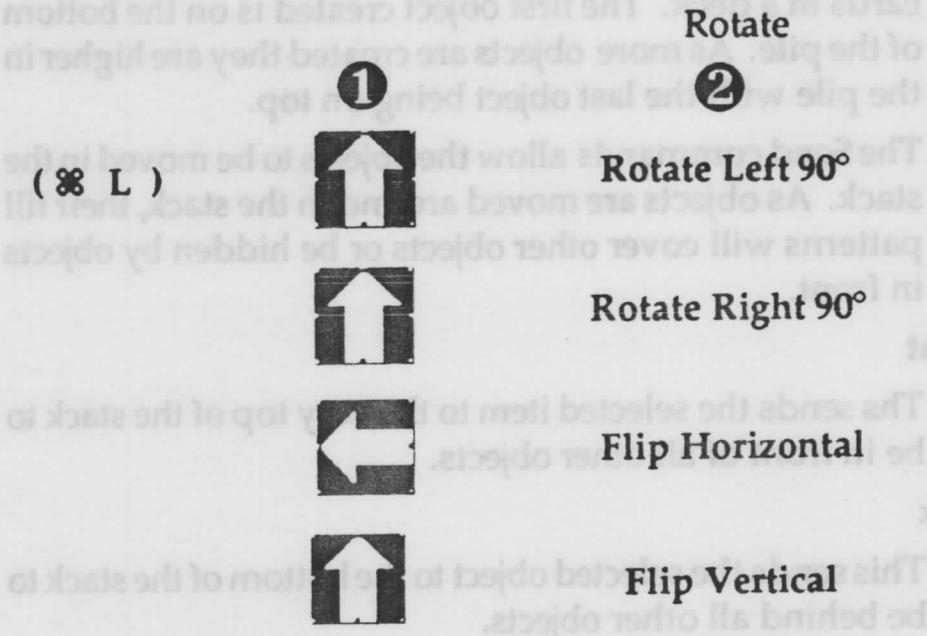


- ⑤ Release the mouse button and move the cursor in a circular motion around the centroid. Click the mouse button to set the rotation. If you hold down the Option key while doing this, an outline of each individual object being rotated will be displayed.

When rotating a group, a bounding box for the group will move with the rotation line and cursor.



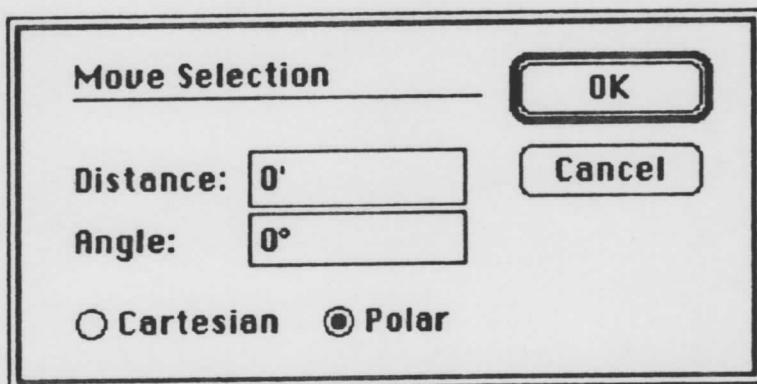
The next four popup menu selection work similar to each other. Select an object(s), select a rotational popup, the object(s) rotate.



Move...

(⌘ M)

Move allows precise placement of an object from its original position by entering coordinates. There are two possible modes under Move..., Polar and Cartesian. The Polar mode can move an object in terms of distance and angle. The Cartesian mode can move an object in terms of its relation to the X and Y axis.



Send

Send To Front ⌘F
Send To Back ⌘B
Send Forward
Send Backward

Each object drawn is created in sequential order like cards in a deck. The first object created is on the bottom of the pile. As more objects are created they are higher in the pile with the last object being on top.

The Send commands allow the objects to be moved in the stack. As objects are moved around in the stack, their fill patterns will cover other objects or be hidden by objects in front.

Send To Front

(⌘ F) This sends the selected item to the very top of the stack to be in front of all other objects.

Send To Back

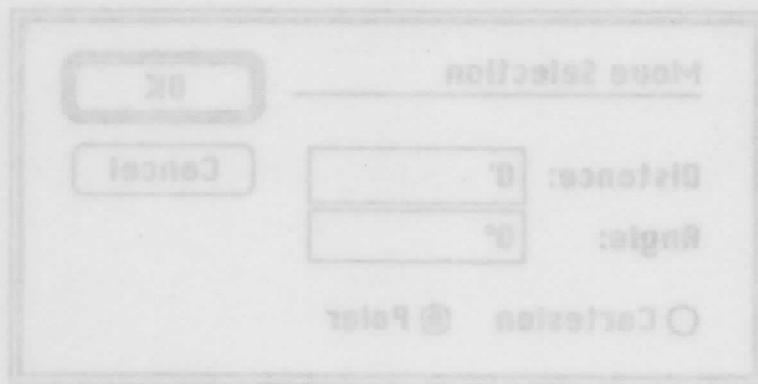
(⌘ B) This sends the selected object to the bottom of the stack to be behind all other objects.

Send Forward

This moves an object one step upward toward the front of the stack.

Send Backward

This sends the selected object one step backward toward the bottom of the stack.



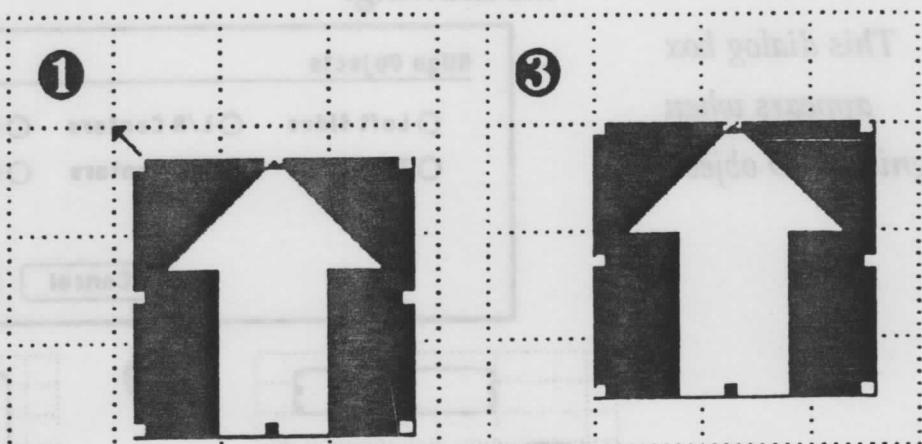
Align To Grid

(⌘ -)

The Align To Grid feature is offered in the event a user did not have snap to grid on during the creation of an object and later wishes to align that object to the current Snap Grid. If the object is selected and Align to Grid chosen, the result will be that the upper left hand corner of the object will be registered to the nearest Snap Grid point.

- ① Select the object you wish to align to the grid.
- ② Choose Align To Grid.
- ③ The upper lefthand corner of the object will be registered to the nearest Snap grid point.

Note: For a shortcut, hold down the Command key and press the '-' key in place of step ②.



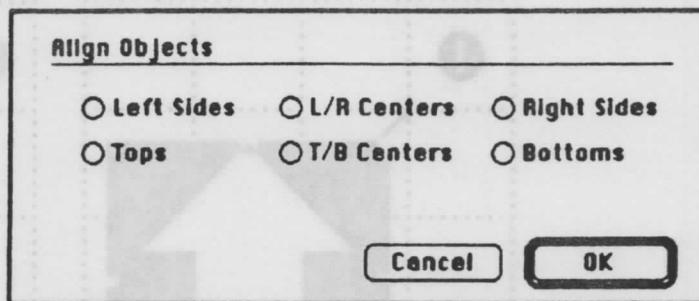
Note: The illustration above used Pen Grids and Reference Grids at same settings.

Align Objects... Select the objects to be aligned, then the menu item or Command/key equivalent.

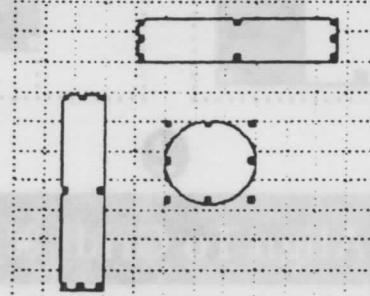
(**88 =**)

- ① When clicking the Tops button, all selected objects' tops will align to the top of the highest selected object. This is true for any direction or combination of directions.
- ② If two buttons are clicked, for example, Tops and Left Sides, all objects will align to the top of the highest object, then align all objects leftwards with the left-most object.
- ③ The exception to this rule involves the locus point. If a locus point is placed all objects will align to the locus point regardless of the locus point's relationship in the drawing.

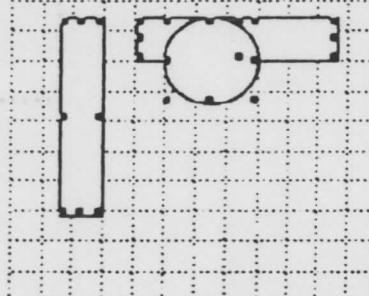
This dialog box appears when aligning 2-D objects.



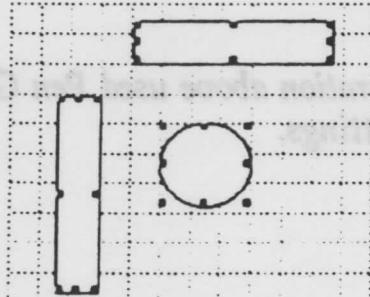
Tops



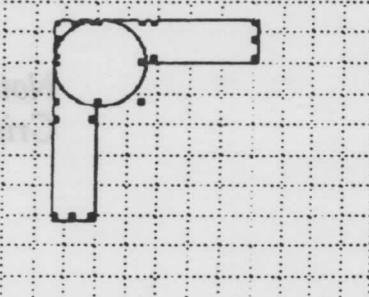
1



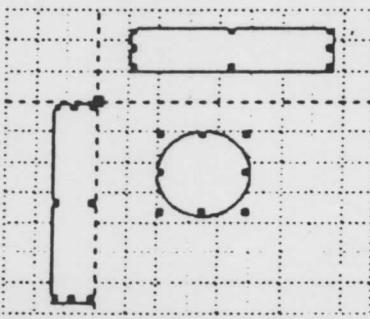
Tops and Lefts



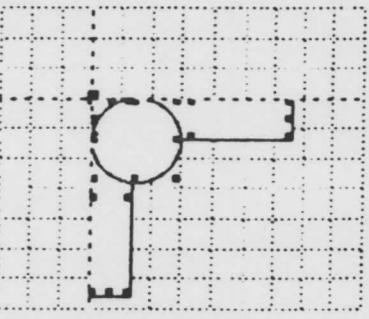
2



Tops and Lefts with Locus Point

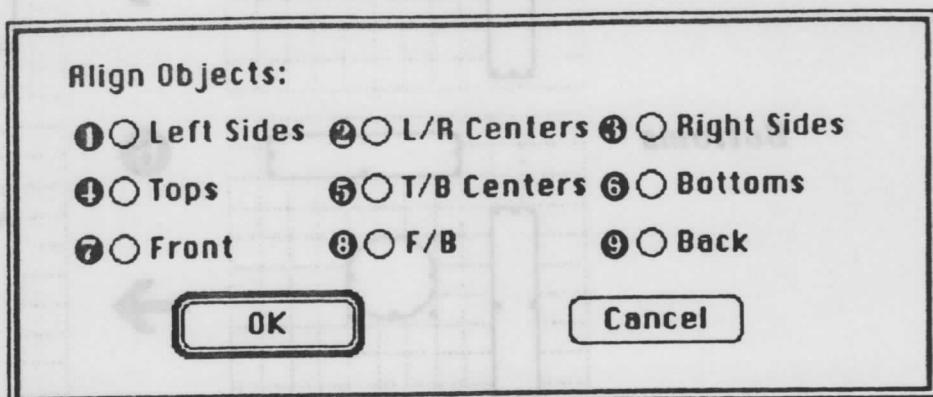


3

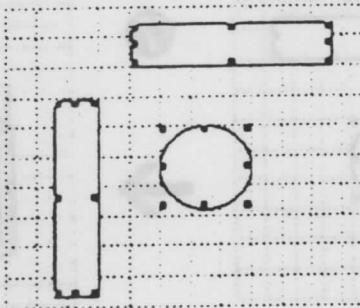


Align Objects

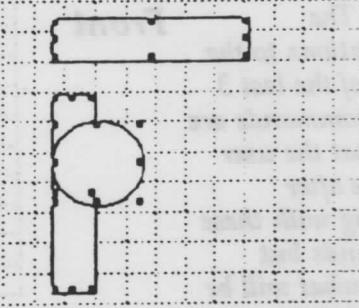
Now that you have seen how objects are interpreted by the align command, we will review the align dialog box. Examples will be given only for one selection at a time. However, the user may use at least 2 selections for a double alignment at any time. All of the commands in the first two rows may be used with 2 or 3-D objects relative to screen position and view at the time of execution. The last row containing Front, F/B, and Back are specifically meant to be used with 3D objects including flat planes such as polygons that have been converted to 3D.



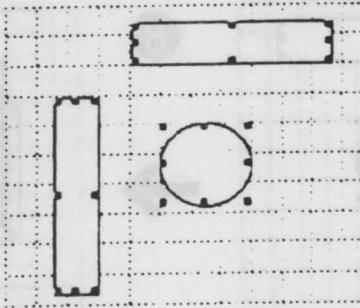
Left Sides



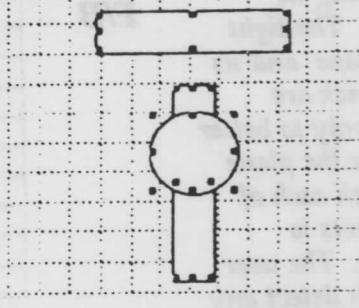
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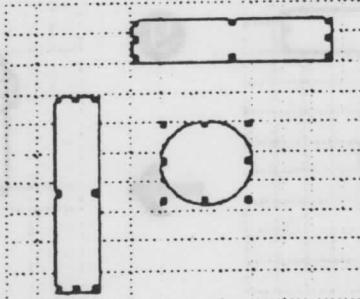
L/R Centers



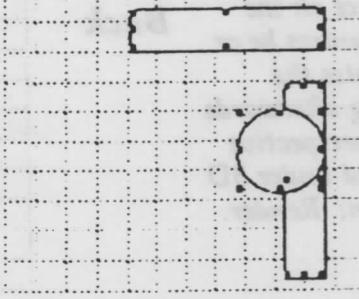
2



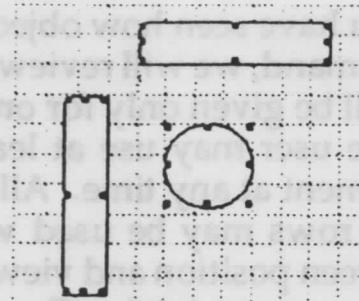
Right Sides



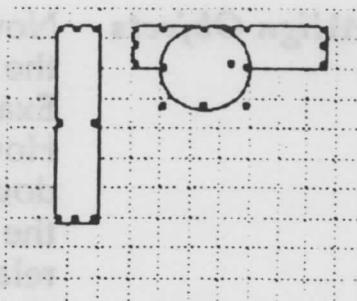
3



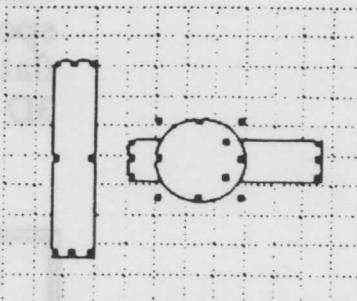
Tops



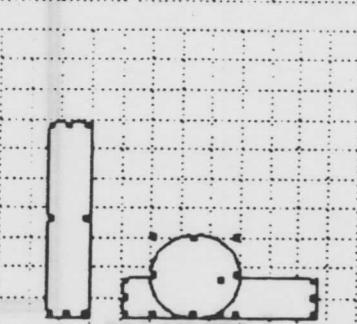
4



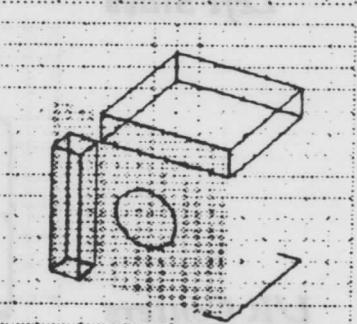
5



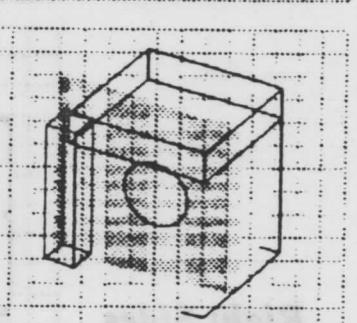
6



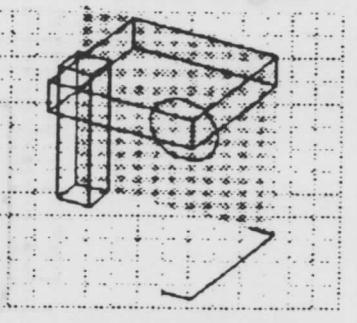
7



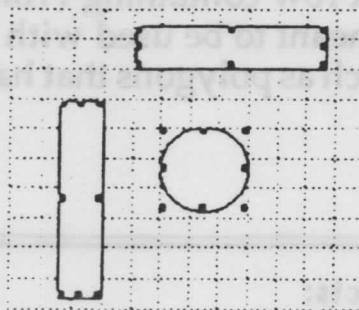
8



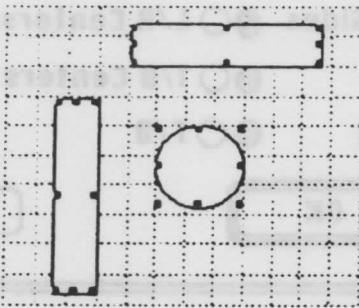
9



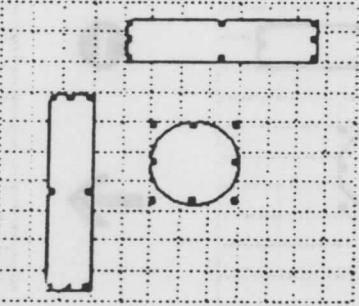
T/B Centers



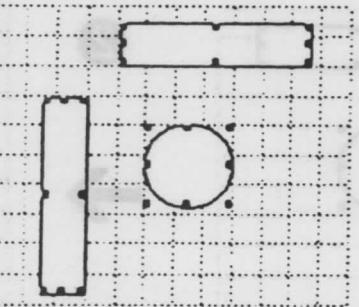
Bottoms



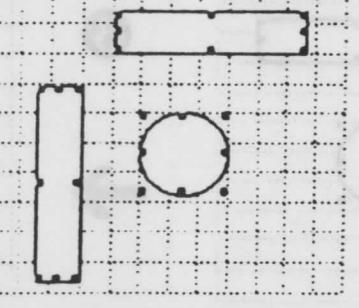
Front



F/B



Back



Note: The illustrations to the right of the last 3 align commands are not what the user will see after aligning with these commands but rather what will be happening in theory. The light gray plane and its floor track are added only to better indicate the plane on which each of the objects is aligned. The user may not detect any difference on the screen unless he or she rotates the drawing afterwards or has perspective activated under 3D Creation: Render.

Introduction

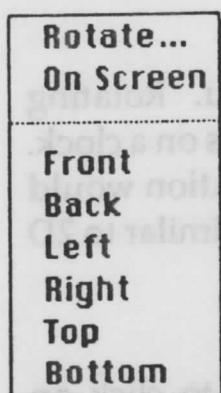
There are three menu items that are specifically used in the creation and rotation of 3D objects:

- 3D View
- 3D Objects
- 3D Creation

Other tools also work with 3D objects as well as 2D objects.

3D creation relies heavily on 2D objects.

3D View



This menu item brings up a dialog box with eight choices of 3D rotation to manipulate the view of all 3D objects in the drawing. There is no need to select any objects when choosing any 3D View menu items.

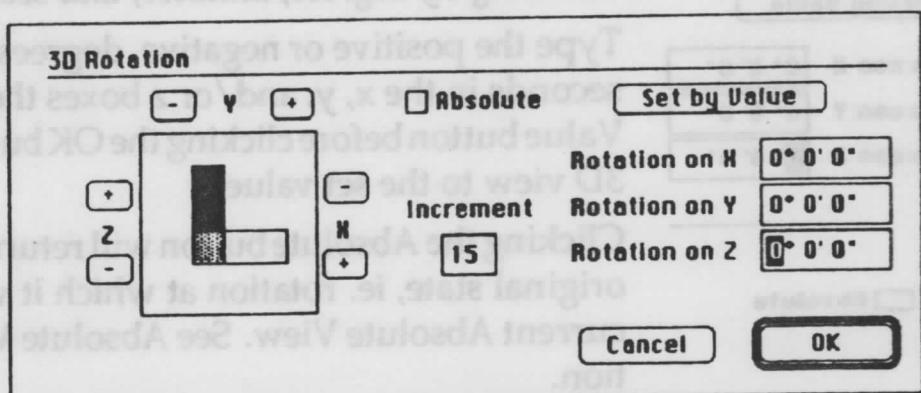
The rotation of 3D objects ignores any 2D objects in the drawing. 2D objects remain constant.

The first two options in the pop-up menu are used to rotate the view to any angle. The six items in the lower section of the popup menu are to take you to a set view .

Rotate...

Brings up a dialog box through which the user may:

- Type the desired rotation with the accuracy in degrees, minutes, and seconds
- Use buttons to rotate in defined increments on each axis.



X Rotation

The X axis is a horizontal line. Rotating objects on the X axis will topple them to or from you. Using Absolute Views as an example, X rotation is going from Top to Front to Bottom to Back. Using this sequence in reverse is also X rotation.

Y Rotation

The Y axis is a vertical line. Rotating objects on the Y axis will swing them to or from you. Using Absolute Views as an example, Y rotation is going from Front to Left to Back to Right. Using this sequence in reverse is also Y rotation.

Z Rotation

The Z axis is a line pointing directly at you. Rotating objects on the Z axis will move them as hands on a clock. Using Absolute Views as an example, Z rotation would keep you in the same view while rotating it similar to 2D rotation.

Rotating with buttons

This section of the dialog box allows you to click on buttons that set the rotation in X, Y, or Z. The object in the box rotates in the direction of the button that is clicked.

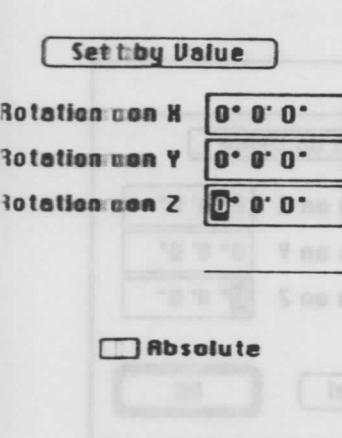
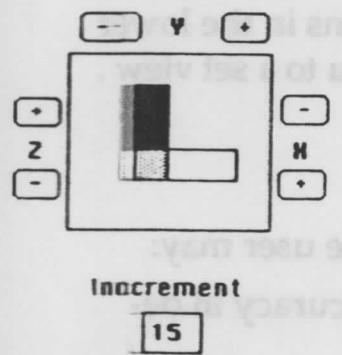
The degree of rotation for each time the button is clicked is set by changing the number in this box to the increment wanted. The program default is 15°.

When the model in the box is rotated as you want to view the 3D objects, click the OK button and the program will rotate to that view.

Rotating by degrees, minutes, and seconds

Type the positive or negative degrees, minutes, and/or seconds in the x, y, and/or z boxes then click the Set By Value button before clicking the OK button will rotate the 3D view to the set value.

Clicking the Absolute button will return the rotation to its original state, ie. rotation at which it was created in the current Absolute View. See Absolute Views for clarification.



Rotate on Screen

This gives you the ability to rotate the view by clicking and dragging the mouse. No objects need to be selected. Select the menu item then click the mouse and drag it the direction you want to rotate.

Where you click on the screen is the point of the present view. The direction you move the cursor when you click and drag is where you want the new view to be.

Moving the cursor vertically downward will change X in positive degrees, upward is -X.

Moving the cursor to the right is positive Y and left -Y.

Moving the cursor counter clockwise is positive Z and clockwise is -Z.

Usually the On Screen rotation is to get a quick look at a rotated object, the angles can not be precisely set.

Normal

When rotating with On Screen a bounding box will show the rectangular outline of all the 3D objects.

Option

Holding down the Option key while dragging the cursor to do the rotation will redraw the objects to show how they look as they are being rotated

Absolute Views

The lower section of the 3D View popup menu contains six Absolute Views. The program defaults to the Top View.

The absolute views allow you to work on 3D objects on an X - Y plane. Thus virtually all 2D edit tools may be used with 3D objects.

From Top and Bottom views the X - Y plane would be the length and width of a building. From the Front and Back views it would be the width and height. From the side views, it would cover the length and height.

Thus, from any Absolute View you can work on two dimensions without changing the third. And since you are working on 2 dimensions, you can use the 2D tools.

3D Objects

Rotate...

On Screen

Topple Forward

Topple Backward

Swing Right

Swing Left

Selecting 3D Objects allows the manipulation of individual objects within the 3D View. Here it is necessary to select the objects to work with.

The pop-up menu options are broken down into two groups similar to the 3D View options. Rotate... and On Screen work the same as in 3D View. The difference is that you are rotating objects within a set view.

As an example, from a Top view a window on the front of a house might need to be duplicated and rotated to be placed on the side of the house. This could not be done with 3D View which changes the overall view.

90° rotations of 3D objects

The four menu items in the bottom of the 3D Objects popup menu will rotate any object(s) at 90° increments.

- **Topple Forward**

Rotates an object(s) 90° moving its top toward you.

- **Topple Backward**

Rotates an object(s) 90° moving its bottom toward you.

- **Swing Right**

Rotates an object(s) 90° to the right.

- **Swing Left**

Rotates an object(s) 90° to the left.

3D Creation

Extrude **⌘E**
Sweep
Multiple Extrude
Convert To Mesh
Convert To 3D
Render
Set Perspective

Any object or series of objects except text can be quickly converted into three dimensional objects or groups. The 3D Creation popup menu gives seven choices of 3D creation.

The results of 3D creation depend upon the type of 2D objects that are used.

Extrude

(⌘ E)

Extrude gives 2D objects depth. The extrusion depth is determined by the selected object's X dimension. When more than one object is extruded the depth is the overall X dimension of all objects selected. The depth may be edited after an extrusion by using Reshape (⌘ R). Or, the extruded object(s) may be reshaped by selecting it and dragging their selection handles.

When more than one object is selected and extruded, the selected objects become Grouped 3D objects. These objects may then be Ungrouped and edited separately.

A 2D Group can not be extruded. It must first be Ungrouped then the selected ungrouped objects may be extruded. Since more than one object is extruded the 3D object will be a 3D Group.

The results of an extrusion depend upon the objects extruded:

- Lines

Extruded lines are flat planes.

- Other Objects

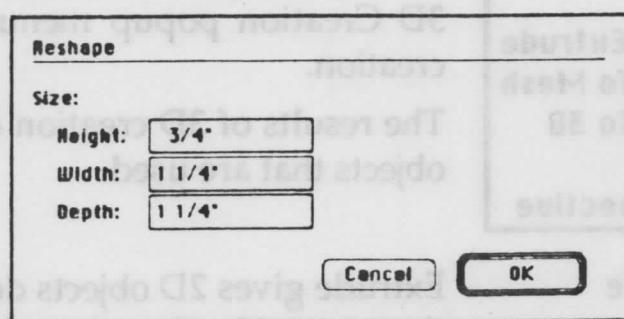
All other 2D objects have a surface and when extruded become wireframe solids.

3D Groups

- When more than one object is selected for Extrude the result is a 3D Group.
- Ungroup will break down 3D Groups into individual 3D objects.

Reshape :

- Click-drag handles.
- Reshape menu item (**R**).



The Reshape dialog box refers to the 3D object as it was created. Height and Width are the 2D attributes of the object. Depth is the extrusion. Typing numbers in the boxes and clicking the OK button will edit the 3D object. Cancel takes you back to the drawing without any changes taking place.

Enter Group

- Takes 3D objects back to their original 2D form for editing.

Exit Group

- Takes edited 2D original and any newly created objects back into 3D giving the depth of original 3D objects to all objects in the edit.

Sweep

Sweep allows the creation of 3D cylindrical objects from 2D objects. A sweep is comprised of four basic elements: Centroid, Arc Angle, Segment Angle, and Pitch.

Lines and surface objects have different results with Sweep. Lines create outlines of surfaces while surface objects create solids.

When multiple objects are swept, the 3D object is a Group of 3D Sweeps which may be Ungrouped and each 3D object edited separately.

Centroid:

The centroid (center of rotation) is established by placing a locus with the object to be swept. The objects to be swept and the Locus must be selected before selecting Sweep.

When a 2D object is swept without a Locus being placed and selected, the object will be swept about itself.

When placing the Locus the Snap functions of the program may be used to set an exact offset from the object to be swept.

Arc Angle:

The Arc Angle represents the angle of sweep. The sweep menu item creates a sweep of 360° (one full rotation). This may be changed to any degree using the Reshape command found under the Edit menu.

Segment Angle:

The more segments that combine to make an arc, the more curved it looks. The default number of segments for a Sweep is 36 or one segment per 10° . The segment angle may also be changed with the reshape dialog box.

Pitch:

The pitch will determine the rise or fall of the angle as the object sweeps giving it a spiral staircase or coil effect. The pitch is given in terms of + or - height per revolution (360°). Therefore, if the pitch is $1/2"$, the object will rise $1/2"$ per 360° of rotation. The Unit used in setting the + or - height is determined by what Units and Accuracy you have set in the Page menu.

The Sweep command uses a Pitch of 0 unit measure. This may be edited in the Reshape dialog box.

Reshape:

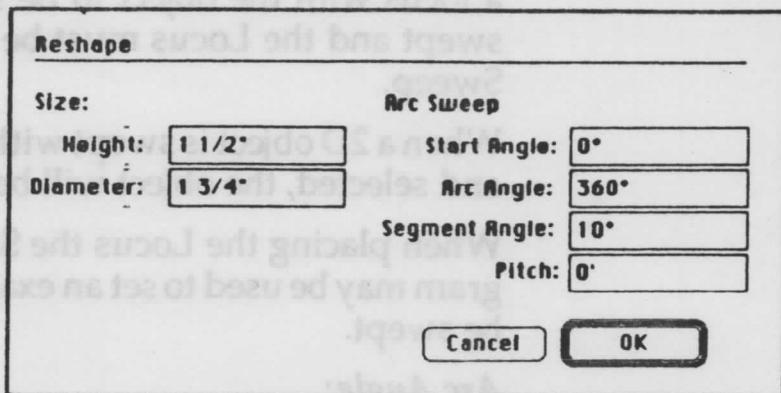
- Selection Handles

The Sweep may be manually resized by grabbing a selection handle and dragging.

If the Sweep is a Group then it may be Ungrouped and each object reshaped manually.

- Reshape menu item

- The Reshape dialog box for a Sweep allows for



the editing of the overall object size and its attributes separately.

- Size

Height and Diameter are the overall dimension.

- Arc Sweep

Start Angle is the point of origin of the sweep. The Sweep command always starts a sweep from 0°.

Arc Angle is the total degrees in the sweep. The Sweep command always makes one rotation or 360°.

Segment Angle is the degree of arc per segment. The Sweep command sets 10° as the segment thus creating 36 segments (degree of sweep 360° divided by degree of segment).

Pitch is the unit measurement of offset for one rotation of sweep. The Sweep command does not give the object any pitch.

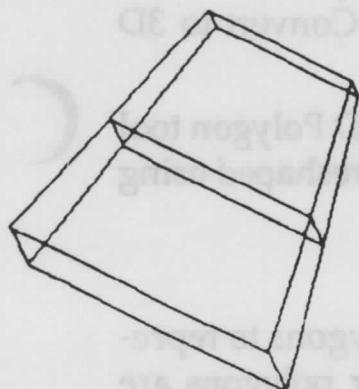
- Enter Group - Exit Group

Enter Group takes the user back to the original 2D object(s) that were swept. Any editing or placement of additional objects will be carried back into the sweep using Exit group.

- Convert to Mesh

Converting a swept object into a mesh allows the user to modify the object by moving its vertices.

Multiple Extrude



Extrudes multiple selected objects in a stepladder fashion. The lowest selected object in the drawing list is extruded to the next higher in the list. Then the second object to the third and so on. The distance between each object is constant.

The X and Y 2D offset between objects is maintained thus allowing multiple extrusions to flare outward, inward, or combinations of both.

The multiple extruded object is a 3D object.

Reshape:

- Selection Handles

This will resize the overall multiple extruded object.

- Reshape menu item

The Reshape dialog box is the same as for Extrude. It allows the reshape of the overall object

- Enter Group - Exit Group

Takes the user back to the original objects to be moved around on screen, change the sequence of the drawing list, and add or reshape objects. Exit Group will add the edits to the multiple extruded object.

- Convert to Mesh

Allows the breaking down of the object into individual parts and worked on vertex by vertex.

With Locus to extrude to a point.

Convert to Mesh

Convert to Mesh allows 3D shapes to be manipulated at each vertex. Selecting several vertices will allow them to be edited together. Meshed objects may be reconverted to wireframes by selecting all its vertices and grouping them.

Editing of meshes can be done with almost all 2D editing tools. Vertices may be moved with the Move command, snapped with any snap command, etc. Enter Group allows working on each polygon group of the mesh.

With Locus to extrude to a point.

Convert to 3-D

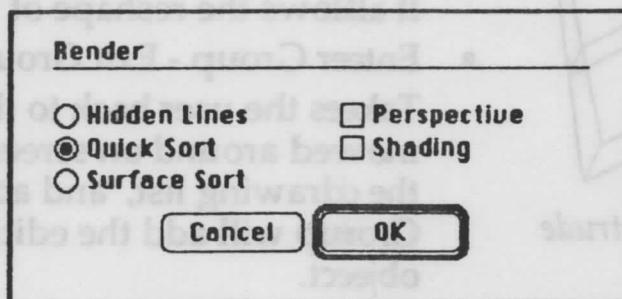
Takes a 2D object that may only be manipulated in 2D space and places it into 3D space. The Convert to 3D object(s) will not have depth.

The same effect can be had by using the 3D Polygon tool in the Drawing Palette. The object may be reshaped using any of the above mentioned tools.

Render

Render creates a series of 2D lines or polygons to represent the selected 3D object. The lines or polygons are placed on top of each other and grouped to give the effect of a real life scene. Selecting Render brings up a dialog box from which you may choose:

- One of the buttons on the left
- Either or both boxes on the right



Hidden Lines

- Renders into lines only, but will clean up the lines so that they appear to render a solid object. The lines will be placed on top of the wireframe grouped with a white rectangle. This allows the rendering to be pulled away from the wireframe and edited.

Quick Sort

- The main advantage of Quick Sort is speed. Quick Sort is the default sort under the Render dialog box. The sort determines the correct placement of objects. Objects that are closer will be placed last so that they will remain on top to hide objects that are further back in space. This sort, although quick, may misplace some polygons.

Surface Sort

- The main advantage of Surface Sort is accuracy. Surface Sort uses a longer sort routine than Quick Sort. The main disadvantage is time and memory.

Perspective

- The program defaults to isometric projections but for dramatic effects the user may wish to use Perspective. If Perspective is chosen the perspective defined by the user using the icons under the Set Perspective Menu will take precedence.

Shading

- Shading will render the drawing with various shades of grays or colors depending on whether colors were assigned to the wireframe with the color menu or not. When you use this menu, the program will look to see if there is a light source icon in the drawing from which to assign the various shades of hue. If no light source icon (a sun icon) is found you will have to click on the drawing to locate the sun and rendering will begin. The rendering will shade according to the position of the sun.

Set Perspective

Allows you to manipulate the result of a Render by changing the distance and focal point of a 3 point rendering. When Set Perspective is selected, the program returns to the drawing but nothing happens until you click the mouse button. Three icons will be placed into the drawing wherever the cursor was when you clicked the mouse button. These icons are initially placed one on top the other.

Camera Icon



The Camera Icon represents the point from which the perspective is being taken. The imaginary line created between the camera and the Subject Icon will be the angle or direction of the perspective.

Subject Icon



The Subject Icon represents the focal plane of the Render. The Subject Icon and anything between the icon and the camera will not Render. This allows placing the Subject Icon inside 3D objects and create renderings from that point on, similar to doing walk-throughs.

Sun Icon

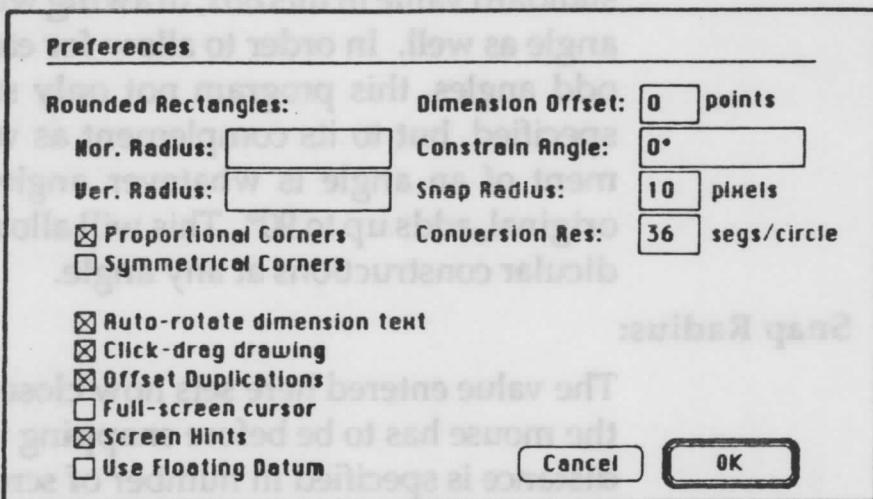


The Sun Icon represents a light source and may be placed anywhere in 3D space in relation to the 3D objects. The light source will act as the origin for the shading if Shading is selected in the Render dialog box.

If more than one Sun icon is in the drawing, the program uses the one selected when doing a Render.

Preferences

This dialog box will appear when Preferences is selected in the Δ menu. The changes made here will set new defaults for the file and will be saved with the file.



Rounded Rectangles:

This item allows the user to set the defaults for the creation of rounded rectangles. If the user types a radius for the X and Y diameters in the edit boxes, then every rounded rectangle created with the tool will have the corner diameters specified here. If the user has no specific dimensions in mind, and checks the proportional corners option, the arcs of the corners will be dependent on the size of the rectangle. If Symmetrical Corners is checked, the rounded corners will have the same dimensions in both the X and Y axes. A full explanation is given in the Palette chapter of this manual.

Dimension Offset:

This sets the default distance that dimension text is offset from the dimension lines. The point size typed here is the offset on the printout regardless of paper scale.

Constrain Angle:

This box allows the user to specify a custom angle for the constraint of mouse drawing. Normally the defaults constrain to 0° , 30° , 45° , 60° , and 90° . By entering a non-standard value in this box, drawing will constrain to that angle as well. In order to allow for easy construction at odd angles, this program not only snaps to the angle specified, but to its complement as well. The complement of an angle is whatever angle, if added to the original, adds up to 90° . This will allow for easy perpendicular constructions at any angle.

Snap Radius:

The value entered here sets how close to an object point the mouse has to be before snapping to that object. The distance is specified in number of screen pixels.

Conversion Res:

Conversion Resolution sets the number of line segments to be placed into curved surfaces when converting them to polygons or lines, or when performing an operation that does an automatic conversion, such as a rotation. The integer number of segments specified here is the number of segments that a 360° arc would have if it was converted into lines. Thus, if 36 segments were specified here, a full 360° arc would be converted into 36 segments (one segment every 10°).

A larger number of segments specified will result in smoother conversions but at the penalty of using more memory and drawing more slowly.

Auto-rotate Dimension Text

This box is checked as a default. When checked, dimension text is automatically made parallel to the dimension line. The rotated dimension will offset from the dimension line at the distance set in dimension offset.

Click-drag Drawing

Changes the mode of drawing with the mouse from click and drag to clicking at the beginning and end of object creation when the default is turned off by clicking in the Click-drag box. This mode is helpful for individuals using digitizing tablets with pens.

Offset Duplications

This box is checked as a default. When checked, normal duplications of objects will offset as explained in the manual section for Duplicate. If the box is deselected, duplications will center on top of the original with no offset.

Full-Screen Cursor

When this option is selected, the cursor in the drawing area will emit a horizontal and vertical solid line from the center of the cursor to the edges of the drawing area.

Screen Hints

This option is defaulted on. Screen Hints turns on the interactive data mode for Smart Cursor. If you do not want the screen hints, deselect this box.

Screen Hints may be temporarily disabled by depressing the Caps Lock key.

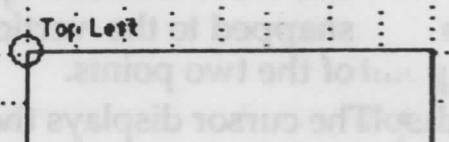
Screen Hints with Snap to Grid

There are no special effects when these two are both active.

Screen Hints with Snap to Objects

When the cursor is moved within the Snap Radius of a Snap Point of an object :

- A small circle appears around the Snap Point.



- To the right of the circle, the program describes the point of the object the cursor is snapped to by name.

Floating Datum

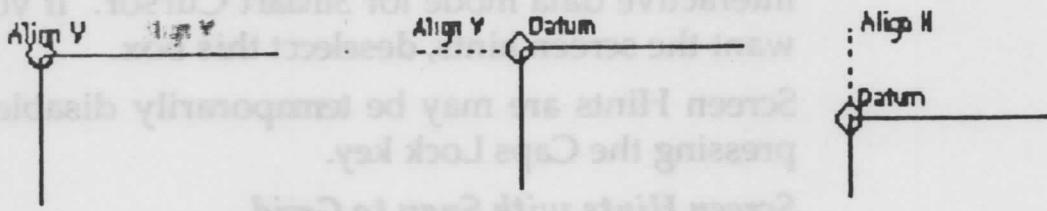
Datum is a variable placed into memory. When the cursor snaps to a Snap Point the location of the cursor is placed into memory as Datum. The user may type an offset to the Datum to which the cursor will snap. Thus, the user may draw or place objects at exact distances from any snap point.

There can only be one Datum point in the memory at a time. Each time the cursor is moved to a new Snap Point, it becomes the Datum point.

If Floating Datum is turned off in the Preferences dialog box, the Origin is set to be the Datum and will remain constant until either the Origin is changed through Set Origin or Floating Datum is turned back on.

Use of Screen Hints and Floating Datum

Each time the cursor snaps to a point that point is placed into memory to allow snapping to the intersections of horizontal and vertical vectors of the snap points.



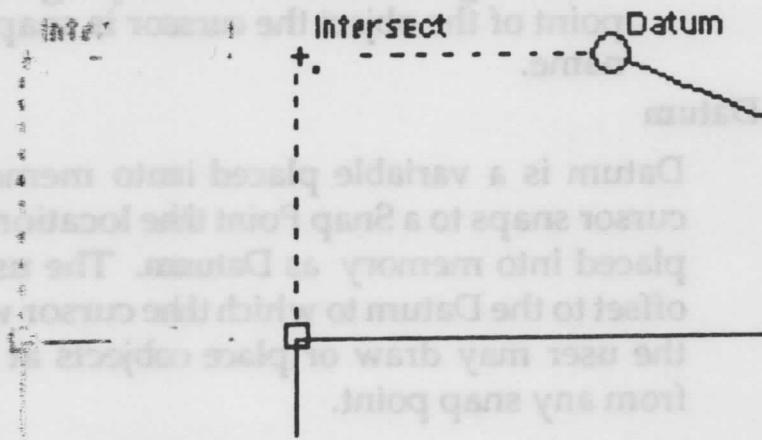
The illustration below shows the result of moving Cursor moved to Top Left of object to set snap point in memory.

Cursor moved to snap point of line to set that point into memory

Moving cursor to the left to get intersection of both snap points.

- The word Intersect appears when the cursor is snapped to the vertical and horizontal intersection point of the two points.

The cursor displays the Snap Dot also.

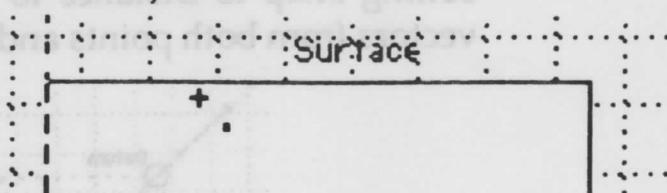


The first snap point that the cursor touched is now indicated by a small square. The second point has a small circle. Each time the cursor touches a new snap point, it is displayed with a small circle.

When the cursor crosses a horizontal or vertical vector of any of the snap points touched by the cursor, the previous points are displayed with squares.

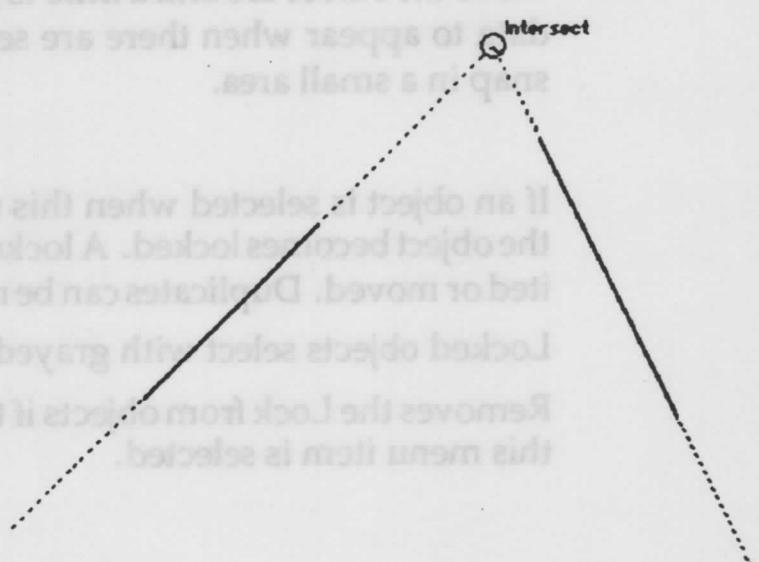
Screen Hints with Snap to Surface

With the Snap to Surface constraint tool selected, the program will display the word 'Surface' to the right of the cursor when the cursor is within the snap influence of the surface of an object.



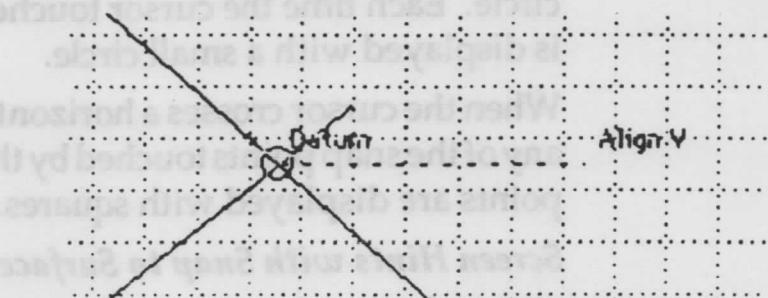
Angle Vectors

To get the vector of an angle thus allowing the snapping to an extension of angled lines or surfaces, move the cursor to the surface of the object. After a brief pause the program will emit a dotted vector from the object. Up to two objects may be stroked to get a dotted vector of their surface. Stroking a third surface will delete the first.



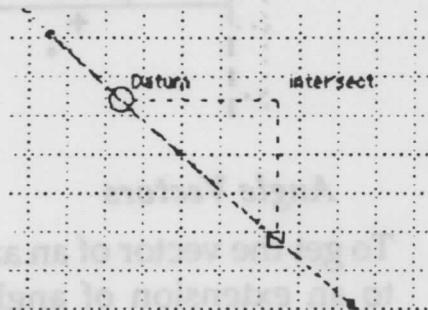
Screen Hints with Snap to Intersection

This works similar to Snap to Objects by setting the intersection as Datum and Align H or V



Screen Hints with Snap to Distance

Setting Snap to Distance to 25% of the object can get vectors from both points and snap to their intersection.



Screen Hints with snapping combinations

Virtually any combination of constraints may be turned on with screen hints. It may however be necessary to move the cursor around a little to get the particular snap data to appear when there are several combinations of snap in a small area.

Lock

If an object is selected when this menu item is selected, the object becomes locked. A locked object can not be edited or moved. Duplicates can be made of locked objects.

Locked objects select with grayed handles..

Unlock

Removes the Lock from objects if they are selected when this menu item is selected.

Color Menu

256 Colors

Menu

16 Colors or Less

11.3	Fill Foreground	11.8
11.4	Fill Background	11.8
11.4	Pen Foreground	11.9
11.5	Pen Background	11.9
11.6	Put Down colors	11.10
11.6	Pick Up Colors	11.10
11.6	Use Layer Colors	11.10
11.7	Use B&W Only	

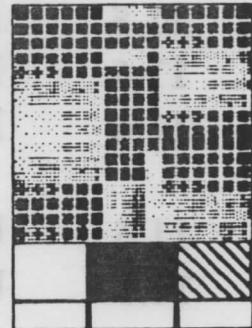
Color Menu Popup Menus

256 Colors

Menu

- 11.3 Fill Foreground
- 11.4 Fill Background
- 11.4 Pen Foreground
- 11.5 Pen Background

For All Four



16 Colors

Menu

- 11.3 Fill Foreground
- 11.4 Fill Background
- 11.4 Pen Foreground
- 11.5 Pen Background

For All Four

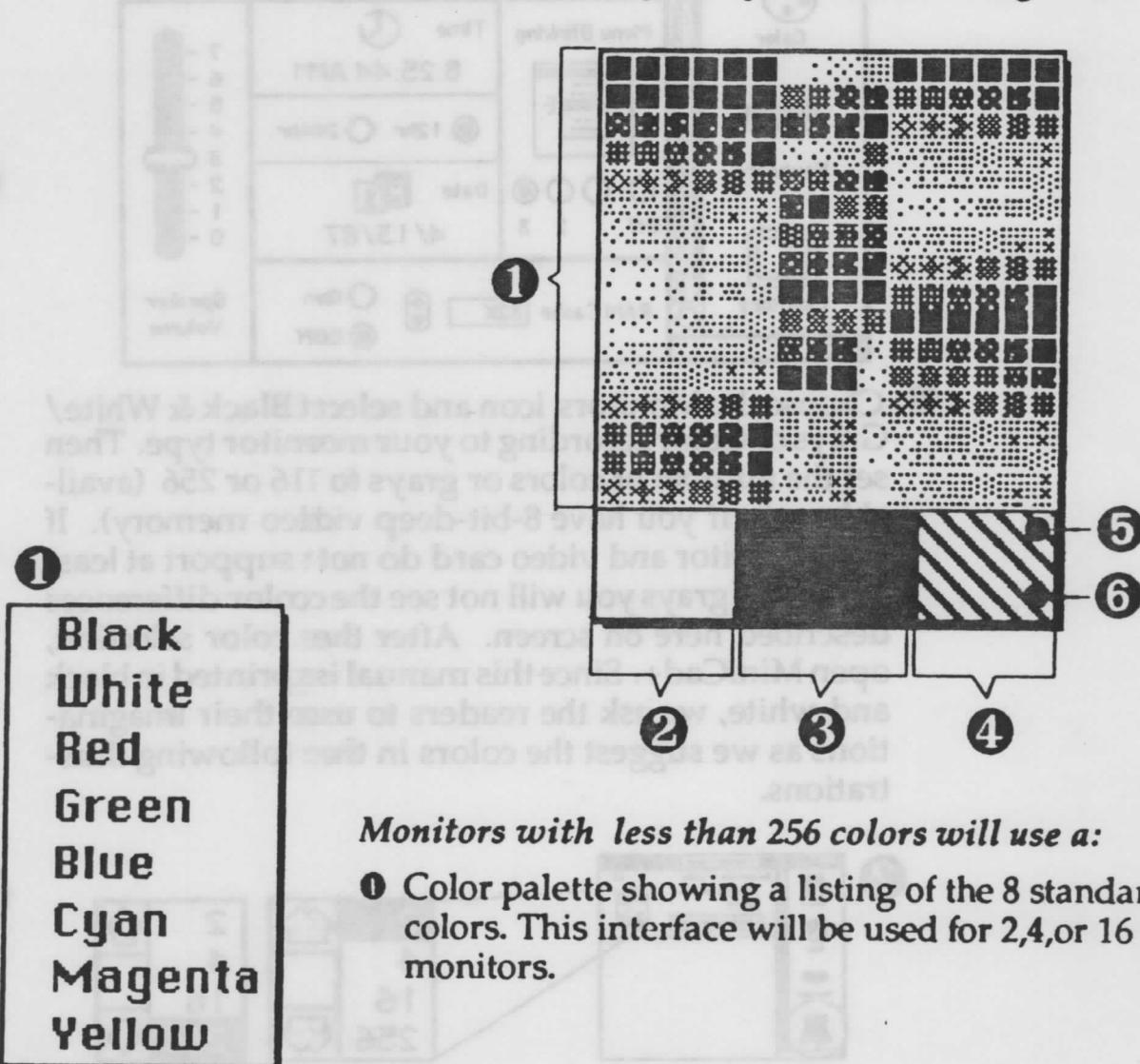
-
- Black
 - White
 - Red
 - Green
 - Blue
 - Cyan
 - Magenta
 - Yellow

Introduction to Color

This chapter is broken into 3 basic parts: Monitors with 256 colors, Monitors with less than 256 colors, and Color representation.

Monitors with 256 colors will use a:

- ① Color palette showing a matrix of 256 system colors. At the bottom there is a band showing three larger areas.
- ② The lower left area shows the present Fill Background color.
- ③ The lower center area shows the present Fill Foreground color.
- ④ The area to the right shows the present Pen Foreground and Background colors.
- ⑤ The black stripes depict the Pen Foreground.
- ⑥ The white stripes depict the Pen Background.



Monitors with less than 256 colors will use a:

- ① Color palette showing a listing of the 8 standard colors. This interface will be used for 2, 4, or 16 color monitors.

Monitors 256 Colors

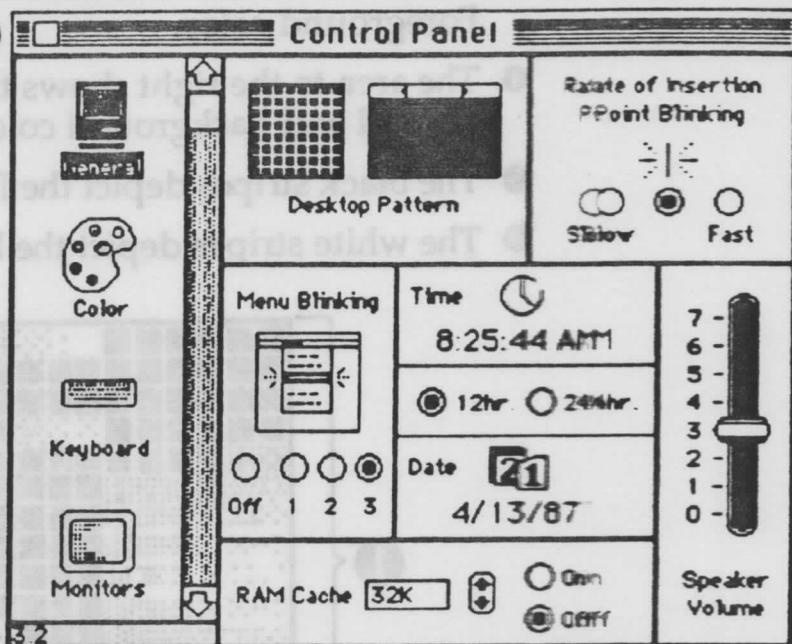
Set Up

Important: Before starting, draw two boxes with very thick border lines on the screen, then highlight the lower box. This simple illustration will be the color guinea pig for our demonstration of the next four sections: Fill Foreground, Fill Background, Pen Foreground, and Pen Background. As the tutorial proceeds, follow the boxes through each step as colors are assigned to the various components of the objects.

To fully display the colors:

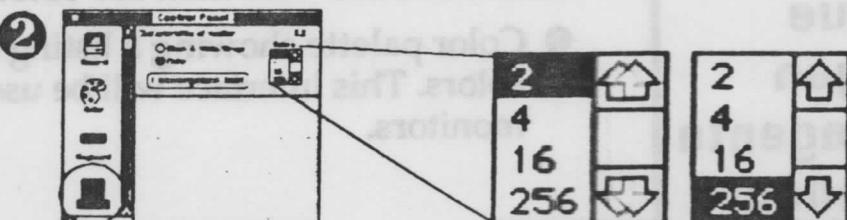
- 1 Choose the Control Panel under the Apple menu.

①



- 2 Choose the Monitors icon and select Black & White/Grays or Color according to your monitor type. Then set the number of colors or grays to 116 or 256 (available only if you have 8-bit-deep video memory). If your monitor and video card do not support at least 16 colors/grays you will not see the color differences described here on screen. After the color selection, open MiniCad+. Since this manual is printed in black and white, we ask the readers to use their imaginations as we suggest the colors in the following illustrations.

②



Fill Foreground

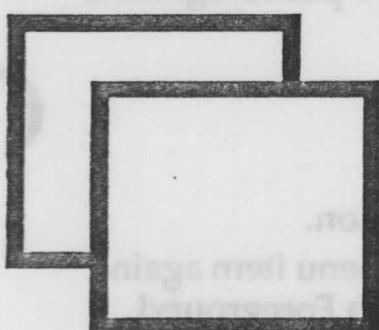
When Fill Foreground is chosen, a sub-menu will appear containing the Color Palette. The color palette contains all 256 system colors. Primary colors are located in the center band.

- 1 Simply select any color palette item and the color picker dialog box will appear. Choose yellow for this demonstration.

If you should select the Fill Foreground menu item again, you will notice that the Current Fill Foreground item of the sub-menu will be colored with your new selection (yellow).

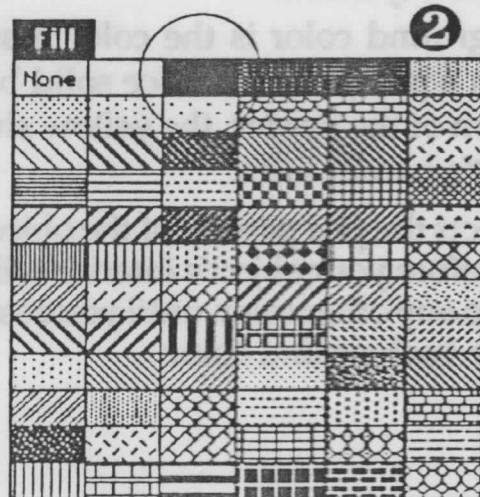
The foreground color is the color assigned to black pixels in a fill pattern. Therefore, since the default of the application is to give you black pen lines and empty fill patterns, you will not see a change in the color of the selected object.

Black border
Empty fill pattern

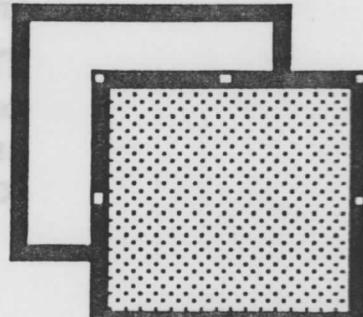


- 2 Select the solid black pattern under the Fill menu; the color yellow should appear on your object.

This only affects the fill pattern of the object, not the border lines. Therefore your lines will remain black and not turn to a color until you assign new pen foreground or background colors.



Black border
Solid yellow fill pattern



Fill Background

When Fill Background is chosen, a sub-menu will appear containing the menu items Any Color and Current Fill Back.

- Choose red for this demonstration.

If you should select the Fill Background menu item again, you will notice that the Current Fill Back item of the sub-menu will be colored with your new selection (red).

The background color is the color assigned to the white pixels in a fill pattern. Since the solid black fill pattern was chosen most recently, you will not see red on the selected object.

- Select the solid white pattern under the Fill menu; the color red should appear on your object.

This only affects the fill pattern of the object, not the border lines. Therefore your lines will remain black and not turn to a color until you assign new pen foreground or background colors.

Pen Foreground

- Choose yellow for this demonstration.
- If you select the Pen Foreground menu item again, you will notice that the Current Pen Foreground item of the sub-menu will be colored with your new selection (yellow).

The pen foreground color is the color assigned to the black pixels in a pen pattern. Since solid black was the original pattern of the border, the yellow should appear on your object's border lines.

This only affects the pen pattern of the object, not the fill pattern. Therefore your object's interior will remain red and not turn to any other color until you assign a new fill foreground or background color.

Pen Background

Choose light blue from the color palette for this demonstration.

If you select the Pen Background menu item again, you will notice the menu will be colored with your new selection (light blue).

The background color is the color assigned to the white pixels in a pattern. Since the solid black pen pattern is the default, you may not see light blue on the screen.

Select the solid white pattern under the Fill menu with the Option key held down; the light blue should appear on your object's border lines.

This only affects the pen pattern of the object, not the fill pattern. Therefore your object's interior will remain red and not turn to any other color until you assign new fill foreground or background colors.

At this point what you should have on the screen is a red box with a light blue border.

Select the medium (50%) gray pattern under the Fill menu; this should result in an orange box as the Fill



Foreground color (yellow) and the Fill Background color (red) mix: $50\% \text{ yellow} + 50\% \text{ red} = \text{orange}$. Although the individual pattern pixels maintain their respective yellow and red colors, the dots are close enough together on the screen for the colors to appear to blend.

Select the medium (50%) gray pattern under the Fill menu while holding down the Option key; this should result in a box with a green line border as the Pen Foreground color (yellow) and the Pen Background color (light blue) mix: $50\% \text{ yellow} + 50\% \text{ light blue} = \text{green}$.

Put Down Colors / Pick Up Colors

These commands are very much like a copy and paste for colors. These commands will only affect an object's colors, not its patterns. On the screen you should have a colored box and a black and white box.

- Highlight the colored box.
- Choose Pick Up Colors from the menu; this copies the pen and fill color selections of your object.
- Select the black and white box. Choose the solid white pattern under the Fill menu.
- Choose Put Down Colors.

The result should be two boxes, one orange and green, the other red fill with a yellow border. If the second, originally uncolored box, had a gray fill and a gray pen pattern, the result would have been two identical boxes.

- Choose the red box.
- Choose the 50% gray pattern under the Fill menu. The result should be an orange box interior.
- Choose the 50% gray pattern under the Fill menu with the Option key held down. You should have matching green borders on the two boxes.

Use Layer Colors

This item disables individual object colors and uses instead the colors assigned to the layers in the Layers Setup dialog box. This is useful for identifying the objects in a layer. To find out more about layer colors see the Layers chapter in this manual.

The object colors that have been set up using the Color menu are not lost, merely hidden. To bring them back into use, select the Use Layer Colors item again. The menu item acts as an on/off toggle switch for this feature. When layer colors are being used, a check mark appears next to the item. This option affects printing and plotting as well as screen display.

Use B & W Only

This item forces all pattern foregrounds to be drawn in black and all backgrounds in white. Selecting this is extremely useful if you have set the number of colors displayed by your monitor to 256 (using the Control Panel) to speed up screen redrawing. When using this small number of available display colors, the foreground and background colors of an object may map to the same display color, rendering patterns indistinguishable. (Even worse, entirely light-colored objects may display all in white, rendering them invisible.) Note that the setting of this item also affects whether printing and plotting are done in black and white only.

Like Use Layer Colors, Use B & W Only is a toggle item. Selecting the item a second time will restore use of the individual object colors (or layer colors if that option is enabled). A check mark appears next to the Use B & W Only item when it is selected.

Monitors 16 Colors or less

Set Up

Important: Before starting, draw two boxes with very thick border lines on the screen, then highlight the lower box. This simple illustration will be the color guinea pig for our demonstration of the next four sections: Fill Foreground, Fill Background, Pen Foreground, and Pen Background. As the tutorial proceeds, follow the boxes through each step, as colors are assigned to the various components of the objects.

Fill Foreground

When Fill Foreground is chosen, a sub-menu will appear listing the colors Black, White, Red, Green, Blue, Cyan, Magenta and Yellow.

Choose any color from the sub-menu, and MiniCad+ will record that color as the fill foreground color for the selected object(s) and as the color for subsequently created objects. Choose Yellow for this demonstration. You will see no color change on the screen; however, the color you have chosen will be output to a printer or plotter that supports color.

The foreground color is the color assigned to the black pixels in a fill pattern. Therefore this item affects only the black portions of objects' interior fill patterns. The pen patterns used for border lines are unaffected.

Fill Background

When Fill Background is chosen, a sub-menu will appear listing the colors Black, White, Red, Green, Blue, Cyan, Magenta and Yellow.

Choose any color from the sub-menu, and MiniCad+ will record that color as the fill background color for the selected object(s) and as the color for subsequently created objects. Choose Red for this demonstration. You will see no color change on the screen; however, the color you have chosen will be output to a printer or plotter that supports color.

The background color is the color assigned to the white pixels in a fill pattern. Therefore, this item affects only the white portion of objects' interior fill patterns. The pen patterns used for border lines are unaffected.

Pen Foreground

When Pen Foreground is chosen, a sub-menu will appear showing the colors Black, White, Red, Green, Blue, Cyan, Magenta and Yellow.

Choose any color from the sub-menu, and MiniCad+ will record that color as the pen foreground color for the selected object(s) and as the color for subsequently created objects. Choose Yellow for this demonstration. You will see no color change on the screen; however, the color you have chosen will be output to a printer or plotter that supports color.

The foreground color is the color assigned to the black pixels in a pen pattern. Therefore this item affects only the black portion of an objects' border line pen patterns. The interior fill patterns are unaffected.

Important:

Remember, when choosing a pattern for a line, hold the Option key down while making the selection under the Fill menu.

Pen Background

When Pen Background is chosen, a sub-menu will appear showing the colors Black, White, Red, Green, Blue, Cyan, Magenta and Yellow.

Choose any color from the sub-menu, and MiniCad+ will record that color as the pen background color for the selected object(s) and as the color for subsequently created objects. Choose Cyan for this demonstration. You will see no color change on the screen; however, the color you have chosen will be output to a printer or plotter that supports color.

The background color is the color assigned to the white pixels in a pen pattern. Therefore, this item affects only the white portion of an objects' border line pen patterns. The interior fill patterns are unaffected.

Put Down Colors / Pick Up Colors

These commands are very much like a copy and paste for colors. These commands will affect an object's colors but not its patterns. On the screen you will not see changes as indicated with the boxes below since the screen of a Macintosh SE or Plus does not support color. The box shadings are used to simulate the output from a color printer or plotter.

Using the example, we will assume that the lower box has been colored with:

Fill Foreground: Yellow

Fill Background: Red

Pen Foreground: Yellow

Pen Background: Cyan

- Highlight the box you know to be colored.
- Choose Pick Up Colors from the menu; this copies the pen and fill color selections of this object.
- Highlight the box with no colors assigned.
- Choose Put Down Colors.
- The result should be two boxes that will print or plot in color with a red fill and yellow border. For this both boxes must have been assigned the solid white fill pattern (empty is the default).
- If the second box, originally uncolored, is assigned a gray fill by choosing the 50% gray pattern under the Fill menu, the result will be an orange box interior ($50\% \text{ yellow} + 50\% \text{ red} = \text{orange}$).
- By choosing the 50% gray pattern under the Fill menu with the Option key held down (Pen Pattern), you should have matching green borders on the two boxes ($50\% \text{ yellow} + 50\% \text{ cyan} = \text{green}$).

Use Layer Colors

This item disables individual object colors and uses instead the colors assigned to the layers in the Layers Setup dialog. (The effect of this is apparent, of course, only when printing or plotting.) This option is useful for identifying the objects in a layer. To find out more about layer colors see the Layers chapter in this manual.

The object colors that have been set up using the Color menu are not lost, merely hidden. To bring them back into use, select the Use Layer Colors item again. The menu item acts as an on/off toggle switch for this feature. When layer colors are being used, a check mark appears next to the item.

Color Representation And Output

The color you pick for an object, the color assigned to it by the program, and the color displayed or printed for it are not always exactly the same due to limitations in color representation. The program maintains internally a color palette of only 256 colors.

The 256 colors used by the program are identical to those of the standard 256-color palette in the System file with the exception of their arrangement. If your color monitor is set up to display 256 colors and you have not modified the color palette in your System, the object colors you see are exactly those assigned by the program. But if you have set your monitor to display only 16 colors or less (using the Control Panel), you will get a color list, listing the 8 standard colors: Black, White, Red, Green, Blue, Cyan, Magenta, Yellow.

A few printers support Color QuickDraw and the same 16.7 million colors displayable on a monitor. Most printers, however, including the ImageWriter II and LQ with color ribbons, can print in only eight colors. These are selected to match the eight colors of the original QuickDraw, and are the same colors you can specify in the program on a Macintosh SE or Plus. Again, the program's 256 colors are mapped to the nearest match of the eight available, but often there is a significant difference in hue between what is displayed and what is printed. Color representation on plotters is similar, with most using only four or eight pens and supporting that number of colors. Because of this, you may want to make your color selections with an eye towards the appearance of your printed or plotted drawing rather than its screen display. On a black-and-white printer or plotter, foreground pixels of patterns will always be drawn in black and their background pixels will always appear white.

MPER JELLINE CORTATES THE PINEAL MEAT, A SPECIFIC MUSK ABSORBENT
WOMAN TURNS HER HAIR AS SILKY AS SNOW. OR FOLLY WITH WHICH TO USE HER
HAIR TO THE FUTURE.

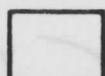
Fill Menu

COLOR REPRODUCTION AND COLOR
COLORS ARE USED FOR THE COLOR SELECTION OF THE
THE BROTHER, SINCE THE COLOR GRAPHS BASED ON PRINTING FOR THE
NOT ALWAYS EASILY THE SAME DUE TO LIMITATIONS IN COLOR
LITERATURE. THE BROTHERS MINISTER IMPROVING A
COLOR BASED ON ONLY 256 COLORS.

THE 256 COLORS USED BY THE BROTHERS ARE IN ACCORDANCE TO THOSE
OF THE STANDARD 256-COLOR BASES IN THE SYSTEM WITH
THE EXCEPTION OF INPUT TRANSLATION. IT AVOIDS COLOR MISMATCH
AS WELL AS TO DISPLAY 256 COLORS AND CAN PROVE NOT NECESSARY
THE COLOR BASES IN YOUR SYSTEM, THE OBJECT COLORS AND THE
THE EXACTA PROCESS SELECTED BY THE BROTHER. BUT IT CAN
PANS SET XANTHOMONATE TO DISPLAY ONLY 16 COLORS OR LESS
(NUR THE COLORFUL LEVEL), YOU WILL SET A COLOR FILE TAKING
THE 8 STANDARD COLORS: BLACK, WHITE, RED, GREEN, BLUE,
CYAN, MAGENTA, YELLOW.

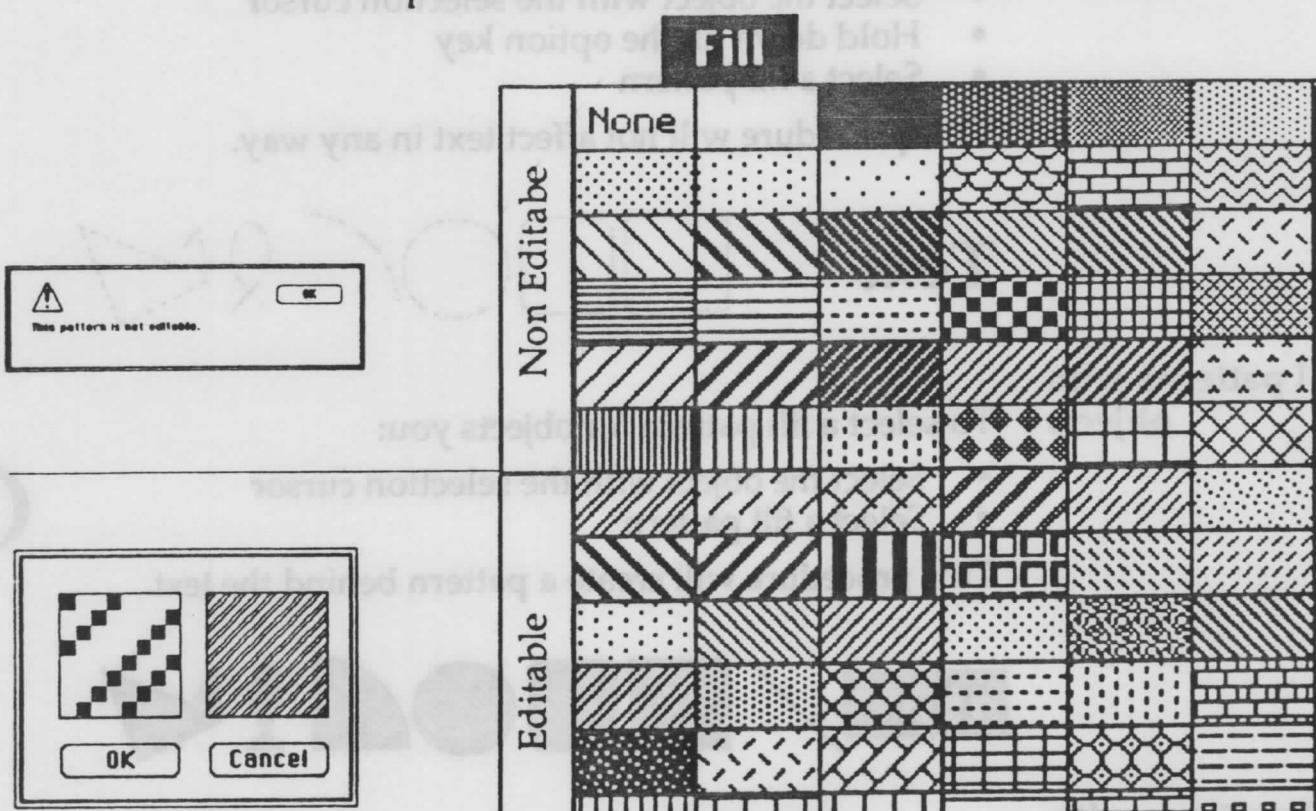
A few printers employ Color Quality Monitor. Most prints
16.7 MILLION COLORS DISPLAYED ON A MONITOR. MOST PRINTERS
DOES, HOWEVER, INCLUDING THE IMAGESET II AND THE QM WITH
COLOR UPDRAFT, CAN PRINT IN ONLY 64K COLOR. THESE ARE
DISPLAYED TO USERS BY THE SIXTY-FIVE COLORS OF THE ORIGINAL COLOR.
DEAR, AND THIS THE SAME COLORS CAN BE SELECTED IN THE
BROTHERS AS WELL AS THE COLOR SET OF THE A601, A651, THE BROTHER'S
256 COLORS THAT MAKE UP THE SYSTEM IS A LUMINOSITY-DISTRIBUTION IN PENS
AND SPOTS, PLUS OTHER THINGS LIKE COLOR COORDINATE INFORMATION. COLOR
PRINTING MUST BE DISPLAYED AND WHILE IT IS PRINTED. COLOR
INTERPOLATION ON PRINTERS IS SIMILAR WITH THAT NUMBER OF
ONLY FOUR OR SIXTY-FIVE BASE SET APPROXIMATELY THIRTY-NINE
COLORS. BECAUSE OF THIS, YOU MAY WANT TO USE A COLOR
COLLECTION WITHIN THE SYSTEM TO GET THE APPROXIMATIONS OF A COLOR
BUT NOT ORIGINALLY FOUND IN A PRINTING SYSTEM. COLOR
ON A PAPER-MAGNETIC TAPE READER OR BOTTLE, FOR POSITIONING LINE
EAS TO POSITION WITH SILKY AS SNOW IN PLACE AND THIS
POSITIONING; PIXELES WILL SILKY AS SNOW.

Current Fill Pattern



The box on the left side of the Data Display Bar will indicate the current fill pattern.

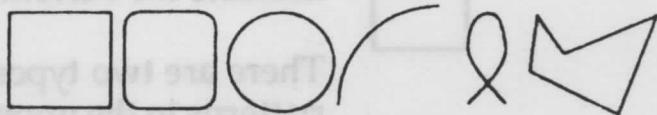
There are two types of fill pattern, non-editable (the 36 patterns in the upper nine rows of the Fill menu, including the "none" pattern) and editable (the 36 patterns in the lower eight rows of the Fill menu). Clicking on the current fill pattern on the palette while an editable pattern is active will display the Edit Fill Pattern dialog box. The user then clicks in the "fat-bits" portion of the dialog box to turn them on or off, creating a new pattern. Clicking OK will then set the new pattern. Editable patterns are saved with the document.



These are the dialog boxes you would see if you selected a fill pattern and then clicked in the fill pattern edit box located at the left of the Data Display Bar.

Chapter 11 Fill Patterns

Text



Fill Types

The default of Fill is black line/white fill. We will examine the many possibilities of fill by looking at an assortment of objects and fill selections.

Fill patterns with lines and borders

Option

To select a fill pattern for lines or borders:

- Select the object with the selection cursor
- Hold down on the option key
- Select a fill pattern

This procedure will not affect text in any way.

Text



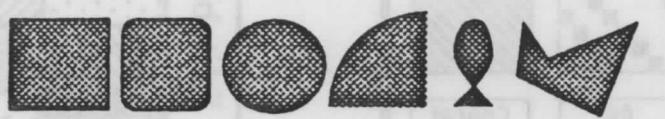
Fill patterns with objects

To select a fill pattern for objects you:

- Select the object with the selection cursor
- Select a fill pattern

This procedure will create a pattern behind the text.

Text



Fill patterns with lines, borders & objects

Fill patterns for lines and borders and objects can be the same:

Lines and Borders:

- Select the object with the selection cursor
- Hold down on the option key
- Select a fill pattern

Objects:

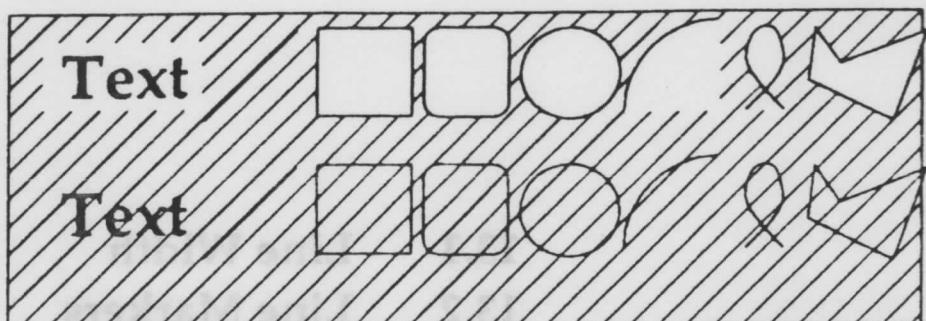
- Select the object with the selection cursor
- Select a fill pattern

Text

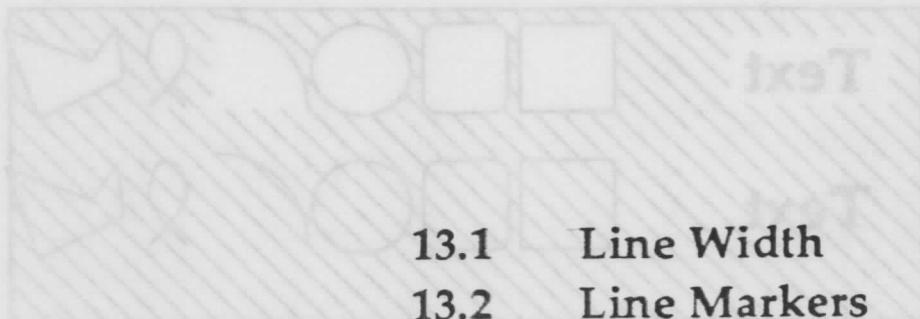


Fill vs. no Fill

The upper left fill, labeled None, allows objects to be transparent (as seen below). The top row of objects are as they appear in default mode over a patterned background. The second row is how they would appear over a patterned background if the None fill pattern were chosen.



III Menu



- 13.1 Line Width**
- 13.2 Line Markers**
- 13.4 Line Marker Style**
- 13.6 Line Style**

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

The quick brown fox jumps over the lazy dog.

// Menu

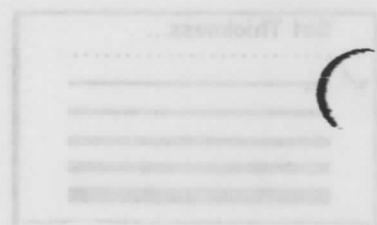
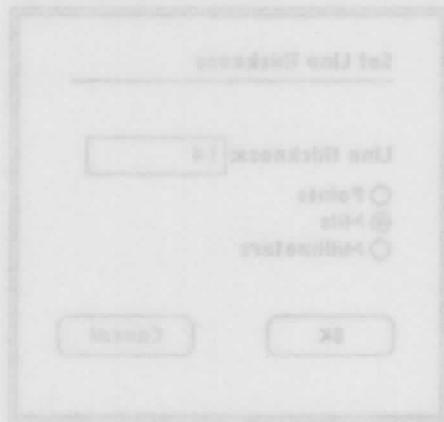
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

size 22pt of font: 18pt

mm & pt of font: 12pt

Line width: 2px

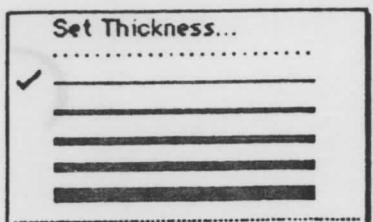


Line width: 2px

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

Section	Additional text field	Text
Section 1	Additional text field 1	Text 1

Line Width



This program allows the user to define the thickness of the line in either Points (1/72"), Mils (1/1000") or Millimeters (1/1000 meter).

The six line selections in the top section of the menu will change an objects line weight by selecting the object then the menu item.

Selecting the menu item with nothing selected in the drawing will change the default line weight to the menu item. All objects drawn from then on will carry the new default until changed again.

The range of these measurements is as follows:

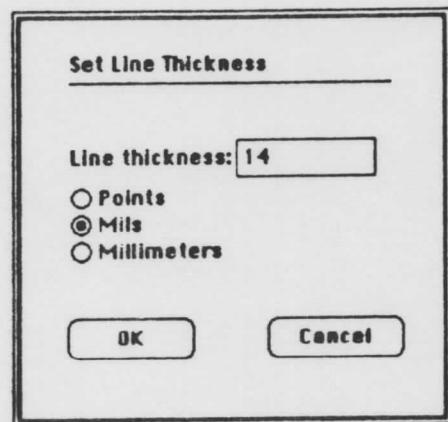
Points: 1/8 Point to 18 3/8 Points

Mils: 1 mil to 255 mils

Millimeter .1 mm to 6.4 mm

Line widths are also available in widths of 1, 2, 3, 5 and 7 pixels.

**Set Line Thickness
Dialog Box**



Holding down the Option key while choosing any default line-weight below, brings up the above dialog box which allows resetting the default thickness for that option.

Before	With this selection	Becomes

Line Markers

The line marker configuration places markers on a highlighted line. Once chosen, the selected marker will remain the default until a new selection is made. Selecting the default marker configuration will turn off the line markers completely.

The options are: no markers, marker at beginning point of line, marker at ending point of line, marker at beginning and ending points of line.

Dimension Option:

Any line you draw may be automatically dimensioned by doing the following:

- ① Select the line you wish to dimension.
- ② Select the "XX" line under the // menu.
- ③ Your line dimension will appear.

The dimension option does not automatically add arrows or markers. If the user wishes to use markers, then a marker configuration must be selected. Once the dimension line is selected it will remain the default until another selection is made.

Text in Dimension Lines may be hidden by:

- ① Selecting the Dimension Line you wish to hide.
- ② Selecting the "XX" line under the // menu.
- ③ The Dimension Text will disappear.

To make the Dimension Text reappear, reselect the Dimension Line and redo the routine above.

To change marker/arrowhead sizes, hold down the option key, and select the desired point size under the 'Text' menu. A '♦' will appear beside the point size you have chosen.

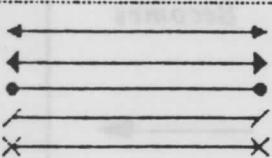
Option



<i>Before</i>	<i>With this selection</i>	<i>Becomes</i>
①	②	

Marker Style

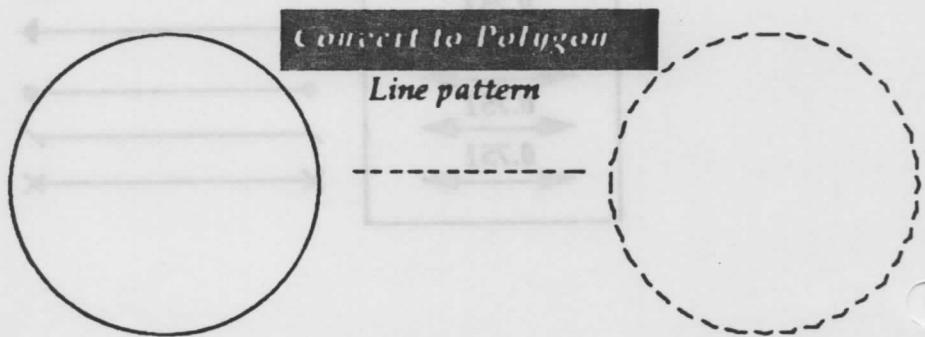
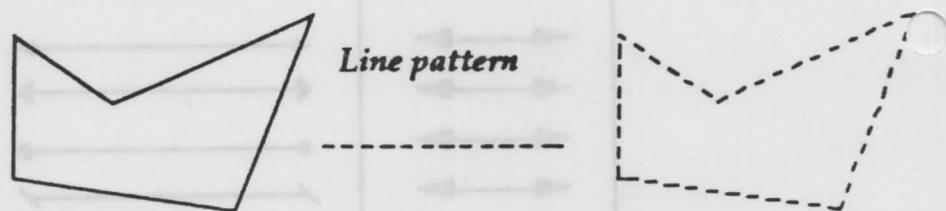
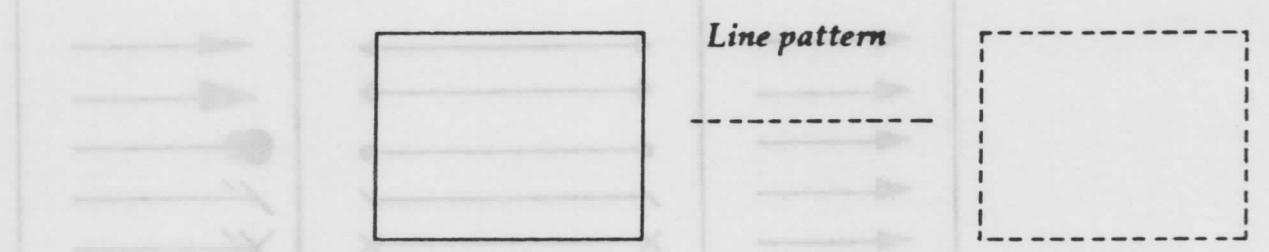
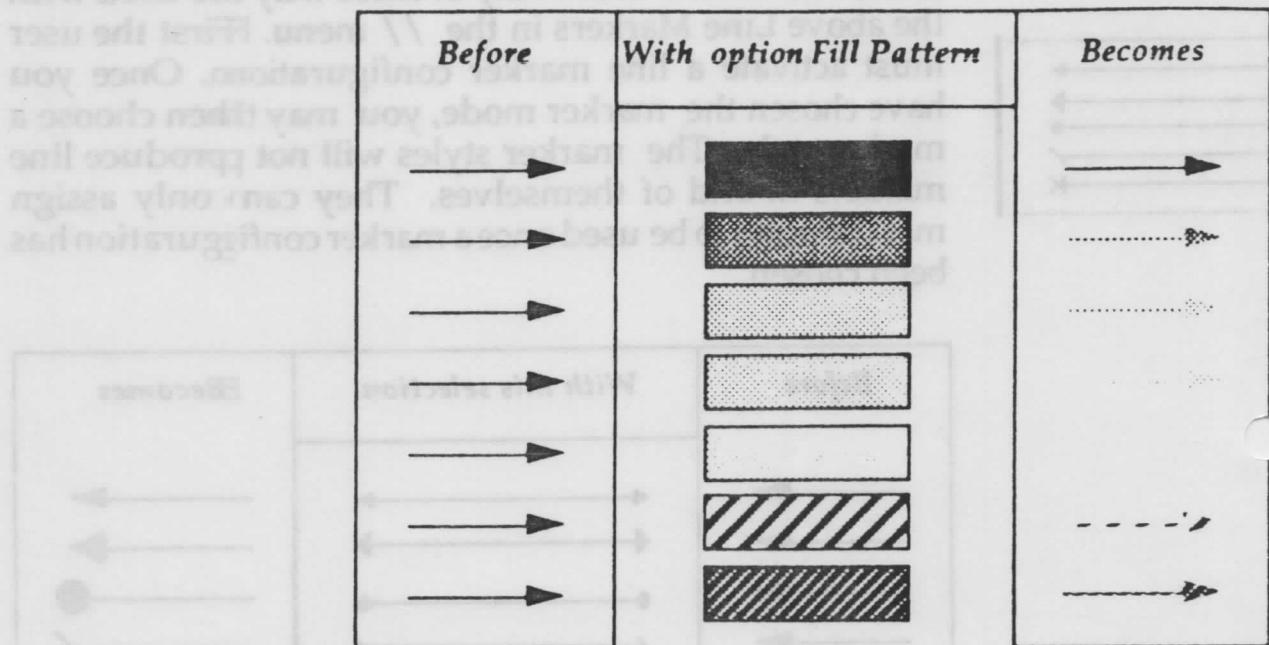
110 edit to continue



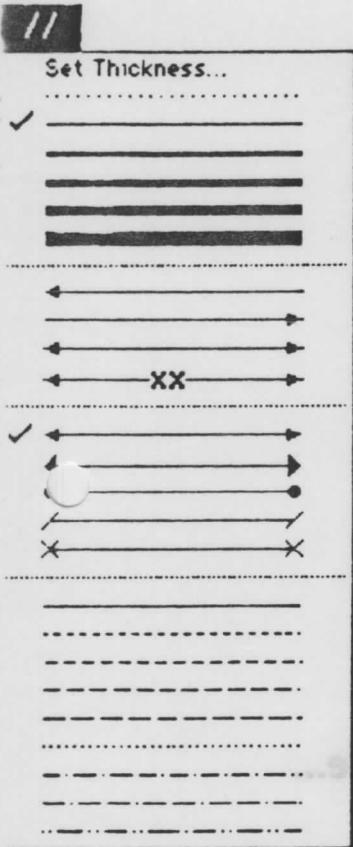
The Arrowhead choices available are thin, standard, dot, slash, and double slash. Any of these may be used with the above Line Markers in the // menu. First the user must activate a line marker configuration. Once you have chosen the marker mode, you may then choose a marker style. The marker styles will not produce line markers in and of themselves. They can only assign marker styles to be used once a marker configuration has been chosen.

<i>Before</i>	<i>With this selection</i>	<i>Becomes</i>
→	→	→
→	→	→
•	•	•
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
→	→	→
0.751	0.751	0.751
0.751	0.751	0.751
0.751	0.751	0.751
0.751	0.751	0.751
0.751	0.751	0.751

These samples show the effect of fill patterns on marker styles. The markers take on the characteristics of the fill pattern.

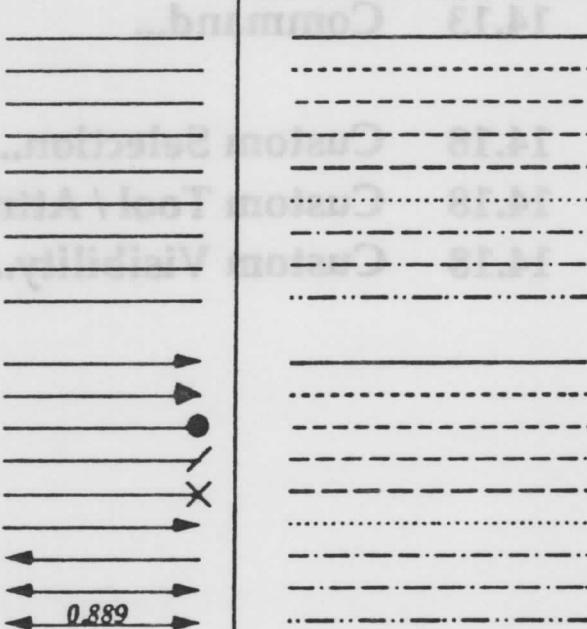
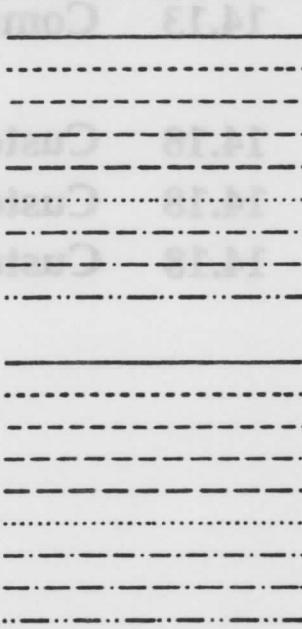
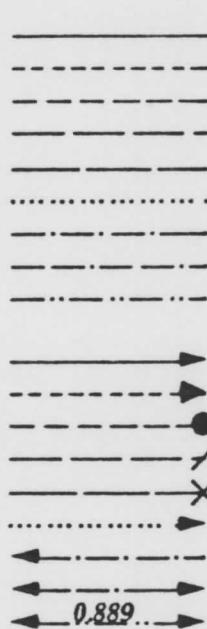


Line Style



You can choose from eight different line styles. Simply select the lines you want and then select the desired Line Style from the // menu. The line styles may also be used with polygons and rectangles.

The line styles cannot be used with an oval/circle and arcs. However, changing these objects to polygons will enable them to have line styles. Prior to converting them to polygons, the user may wish to change Conversion Res in the Preferences menu item to enhance the printing output. See Preferences under the Δ Menu.

<i>Before</i>	<i>With this selection</i>	<i>Becomes</i>
		

⌘ Menu

14.1 Rum Macro...

14.1 Record Format...

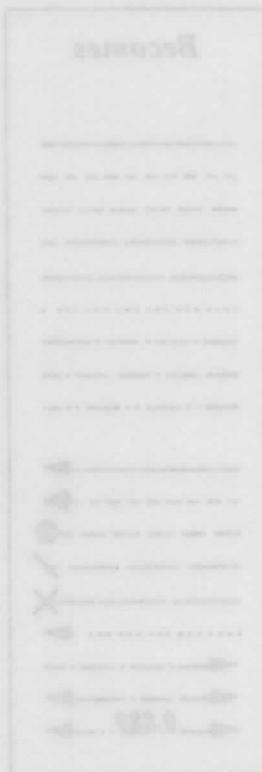
14.5 Worksheet...

14.13 Command...

14.18 Custom Selection...

14.18 Custom Tool / Attribute...

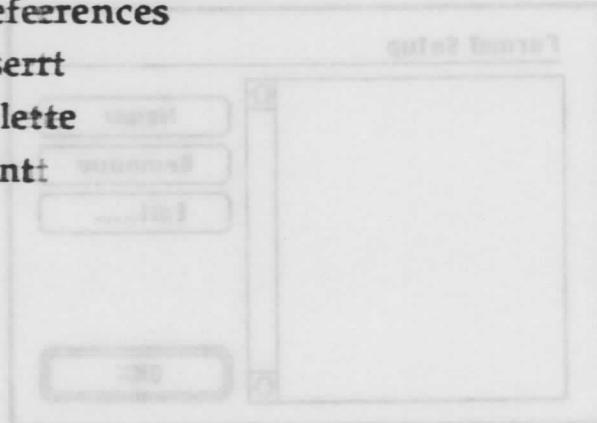
14.18 Custom Visibility...



⌘ Menu Popup Menus

Worksheet Menu

- 14.10 Recalculate**
 - 14.10 Paste Criteria**
 - 14.11 Paste Function**
 - 14.12 Database Headers**
 - 14.12 Number**
 - 14.12 Alignment**
 - 14.12 Border**
 - 14.13 Column Width**
 - 14.13 Preferences**
 - 14.13 Insert**
 - 14.13 Delete**
 - 14.13 Print**



Run Macro...

Existing macros may be placed into palettes and run as commands from a palette. It may not be advantageous for users to place large macros into palettes.

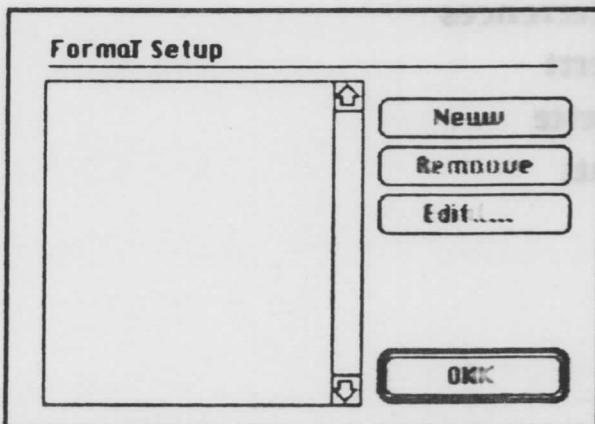
To run a macro from a text file that is not part of a palette, select this menu item. The search dialog that appears will allow you to search any volume accessible to your machine. Select and Open the file that contains the macro.

Record Format...

This program allows the creation and editing of record formats to be assigned to graphic objects. A Format is the form that a record takes. A Record is the actual information associated with the object.

When the menu item, Record Format..., is selected, the Format Setup dialog box appears.

This dialog box controls the records.



- **New**

The New button will bring up the record formatting dialog box. When a Format is created, its name will appear in the Record List above.

- **Remove**

If you select a Format in the list and click the Remove button, the Format and all of its associated records are deleted from the drawing.

- **Edit**

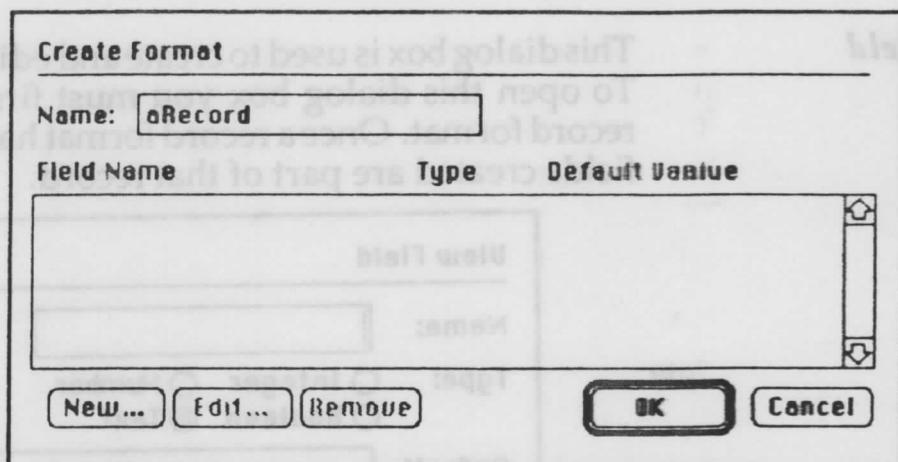
If a format in the list is selected, clicking the Edit button will bring up the Edit Format dialog box.

- **OK**

Clicking the OK button will take you back to the drawing.

Create Format

This dialog box appears when you click on the New button in the Record Setup dialog box. This dialog box controls the creation of individual formats.



Format Name

The data entry box at the top is for the format name. It is selected when this dialog box first opens. Type in the appropriate name for the format you are creating. A Format Name may be up to 20 characters in length.

Field Name List

The Field Name List is empty when a format is first being created.

New...

When this button below the Field Name List is clicked, the View Field dialog box will appear. When a field has been created, its name, type, and default value appears in the Field Name List above.

Edit...

To edit an existing field, select the field in the list then click the Edit button. This also brings up the View Field dialog box.

Remove...

Clicking this button will remove the selected field in the Field Name List from the format.

OK

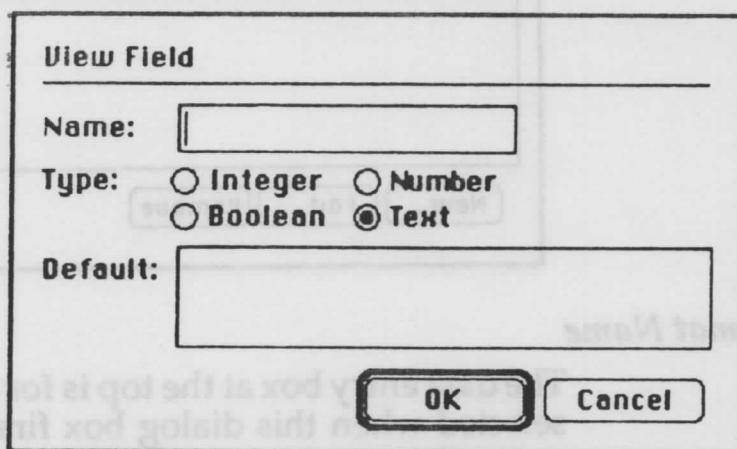
Clicking this button will retain any data entered in memory and return you to the Format Setup dialog box.

Cancel

This button returns you to the Format Setup dialog box without retaining any entered data.

View Field

This dialog box is used to create and edit fields of formats. To open this dialog box you must first create or edit a record format. Once a record format has been entered, all fields created are part of that record.



Field Name

The Field Name entry box is selected when this dialog box appears. Type in a name for the field or edit the existing name if that is the reason you entered this dialog box. A Field Name may be up to 20 characters in length.

Field Type:

Field Values may be Text, Number, Integer, or Boolean.

Text

This is the default selection in the dialog box. Its button has a small black circle in it when the dialog box appears.

If the Text button is selected when the OK button is clicked the field will be set to be searched and handled as text characters.

Number

When you set a field to be of type Number, a 'Format' button appears in the dialog. The default for type Number is General. Clicking on the Format button brings up a popup dialog box from which you may select a different number format.

Integer

This button is to be selected when the field value is whole numbers. Integer format takes less memory than Number Format, thus, it is advantageous to use Integer over Number when dealing with whole numbers.

Boolean

Setting a field value to boolean will return the value of true or false.

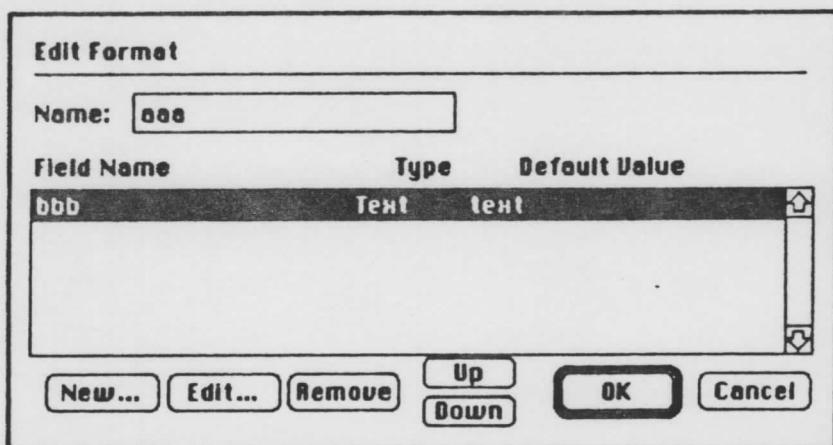
Default Value:

Here you type a value for the field being created. This is called the Default Value box because the values placed here will be assigned with the record when the record is initially assigned to objects. The default may be edited in the Data Palette after the record is assigned to an object.

A Field Value may be up to 32,000 characters in length.

Edit Format

This dialog box appears when you click on the Edit button in the Format Setup dialog box. The differences between this and the Create Format dialog box are the two additional buttons that are located at the bottom of the dialog box between the Remove button and the OK button.



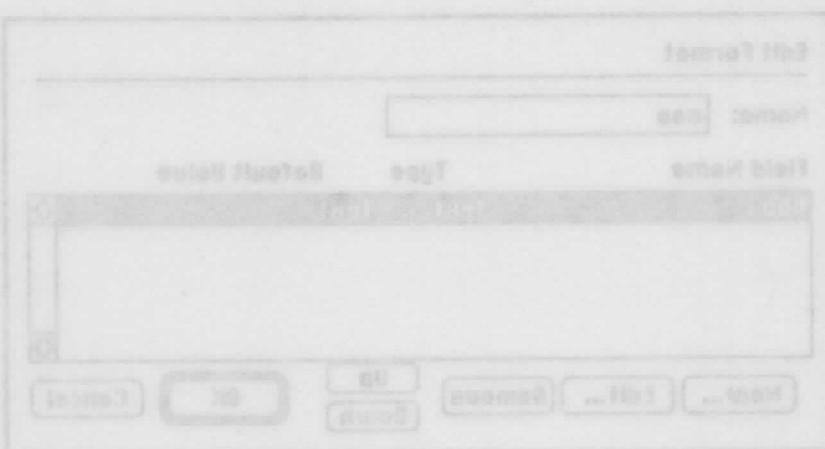
When the Edit button is clicked the View Field dialog box will appear with the selected field name available for editing. When you leave the View Field dialog box you will be returned to the Edit format dialog box.

Up - Down Buttons

When a field is selected in the Field Name List, clicking either of these buttons will move the field name up or down in the list.

Assigning Formats

The formats that are created here may be assigned to objects in the drawing through the Data Palette. The Data Palette is found in the Page menu chapter.

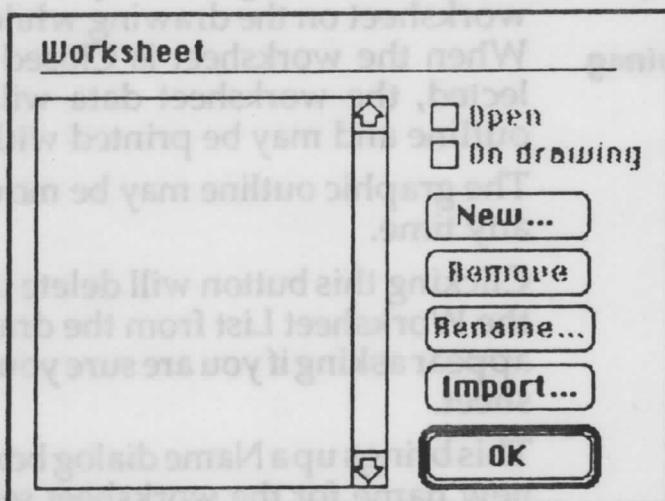


Worksheet...

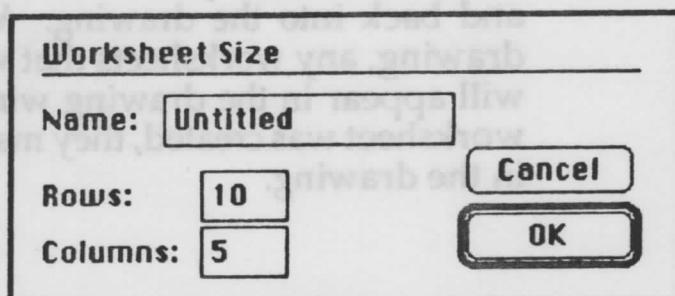
Each worksheet is a floating palette. The palette's name is the name of the worksheet. The dialog box that appears when selecting the Worksheet menu item controls the handling of worksheet palettes.

Only three buttons are selectable when the Worksheet dialog box first appears:

- New...
- Import...
- OK



Clicking the New button brings up a dialog box in which you name the Worksheet and determine its size. Rows and Columns may be Added or deleted from the worksheet with the Worksheet menu items , Insert or Delete.

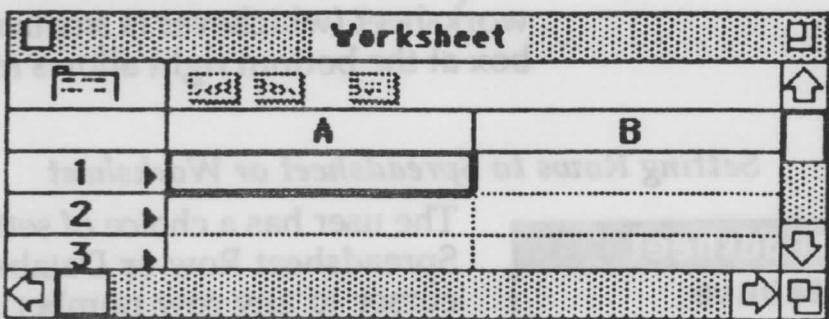


A worksheet may also be resized by using the Resize cursor that appears when moving the cursor to the bottom right of the worksheet.

Open	Activating the Open button will place the selected worksheet palette on the screen. A worksheet must be open for you to use it. Deactivating the Open button will remove the worksheet palette from the drawing window.
<input checked="" type="checkbox"/> Open	The Worksheet palette may also be closed by clicking the Close Box on the palette.
On Drawing	You may place as many worksheet palettes in the drawing widow as you wish. Only one palette may be active at a time. To activate a palette, click on it in the drawing window
<input type="checkbox"/> On drawing	The On Drawing button places a graphic outline of the worksheet on the drawing while the worksheet is Open. When the worksheet is Closed and On Drawing is selected, the worksheet data will appear in the graphic outline and may be printed with the drawing.
Remove	The graphic outline may be moved around the screen at any time.
Rename...	Clicking this button will delete the selected worksheet in the Worksheet List from the drawing. A dialog box will appear asking if you are sure you want to delete the worksheet.
Import	This brings up a Name dialog box into which you type the new name for the worksheet selected in the Worksheet List
OK	This will bring up a Search dialog box allowing you to locate and import a worksheet from another document.

Worksheets

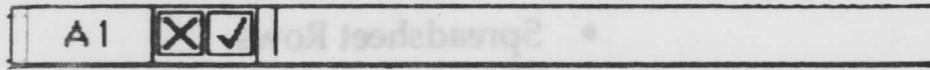
Prior to reading this section which defines the operation of the worksheets, we suggest that you go through the third and fourth sections of the tutorial which illustrate the use of the worksheets.



When a new worksheet is created the palette with its name appears on the screen. The worksheets are floating palettes. They may be moved around the screen, resized, scrolled through, closed, and opened.

Formula Edit Bar

When a worksheet is open and active, a Formula Edit Bar is displayed across the top of the screen. On the left side of the bar is the selected Cell number.



The data typed into the Formula Edit Bar will be placed into the selected cell when:

- Return Key

Pressing the Return key will enter the data into the selected cell and select the next cell. Normally the next cell is the next cell in the column. If several cells in a row are selected prior to typing into the Formula Edit Bar, the next cell will be the next cell in the row.

- Enter Key

Pressing the Enter key will insert the data into the selected cell but will not advance to the next cell.

- Checkmark Button

Clicking the Checkmark button in the Formula Edit Bar does the same as pressing the Enter key.

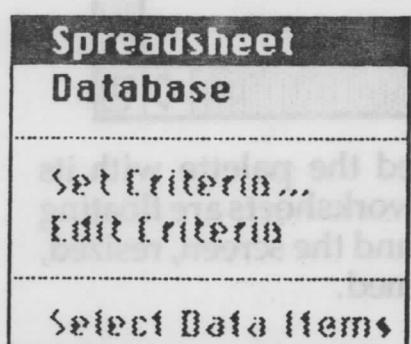
- X Button

Clicking the X button will return the Formula Edit Bar to its previous state prior to typing new data.

Resizing Worksheet

The Zoom box at the top right of the palette will go from the palette window to full screen or to the full size of the worksheet (whichever is smaller) and back. The Resize box at the bottom right allows manual resize.

Setting Rows to Spreadsheet or Worksheet



The user has a choice of setting a Row to work as a Spreadsheet Row or Database Row by moving the cursor to any row number and pressing down the mouse button. The entire row will be set to work as a Spreadsheet or Database Row no matter how many columns are in the row.

A popup menu will appear from which Spreadsheet or Database may be selected. The other choices in the popup menu are only available for selection when you first enter the popup menu.

Spreadsheet Row vs Database Row

- **Spreadsheet Rows**

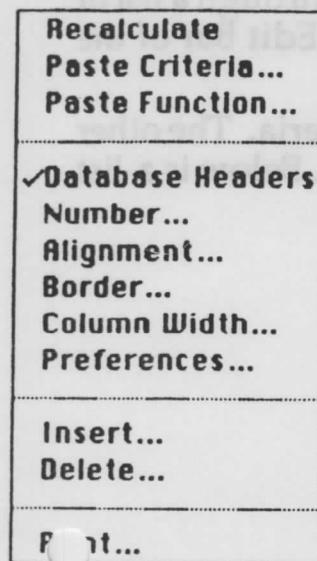
These cells behave as normal spreadsheet cells either displaying a constant or value of a formula.

- **Database Rows**

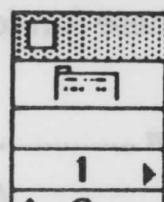
When Database is selected the Search Criteria dialog box appears to link the row to a specific criteria. A Subrow is created for each object in the drawing that meets the criteria, with the row becoming a Header Row.

Each Subrow returns a result based on the formula in the Header Row. The results are totaled in the Header Row.

Worksheet Menu



Each worksheet palette carries its own menu to handle the formulas and setup of the cells. Above the Row Numbers there is a small icon. Pressing the mouse button when the cursor is on the icon will bring up the Worksheet menu.



The Worksheet menu is accessible from an Open worksheet only. Since each worksheet carries its own menu, all settings in the menu are for that specific worksheet.

Worksheet Menu Items

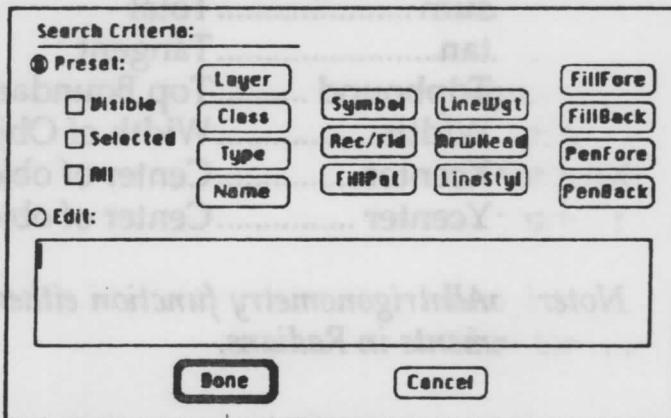
Recalculate

This causes the program to run through the open worksheet and check for any additions or deletions to the drawing and then updates the worksheet.

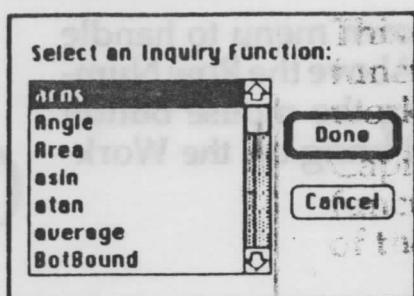
The worksheet is also recalculated each time a change is made to it unless Auto-Recalculate is turned off in the Preferences menu item of the Worksheet menu.

Paste Criteria

Paste Criteria and Paste Function allow the user to more easily create expressions without having to memorize common format commands. Selecting this menu item brings up the Search Criteria dialog box from which you select buttons to get to the lists of Layer, Classes, Symbols, etc. and then select those items from the lists that you want to search on. The compiled list is placed into the Edit window of this dialog box in MiniPascal format.



Paste Function



This dialog box allows you to scroll through a list of functions to paste into the Formula Edit Bar of the worksheet.

Capitalized functions use search criteria. The other functions take number or cell ranges. Below is a list of these functions.

Function Notes

acos	..... Arc Cosine
Angle	..... Angle of Lines
Area	..... Total Area of Objects
asin	..... Arc Sine
atan	..... Arc Tangent
average	..... Average of a series of values
Botbound	..... Bottom Boundary
cos	..... Cosine
Count	..... Number of Objects
deg2rad	..... Degrees to Radians
exp	..... Exponential
height	..... Height of Objects
int	..... Truncates Value
leftbound	..... Left Boundary
length	..... Length of Lines
ln	..... Natural log)
log	..... Log Base-10
max	..... Largest of a series of values
min	..... Smallest of a series of values
Perim	..... Perimeter of Objects
rad2deg	..... Radians
Rightbound	..... Right Boundary
round	..... Round Values
sin	..... Sine
sqrt	..... Square Root
sum	..... Total
tan	..... Tangent
Topbound	..... Top Boundary
Width	..... Width of Objects
Xcenter	..... Center of objects in X direction
Ycenter	..... Center of objects in Y direction

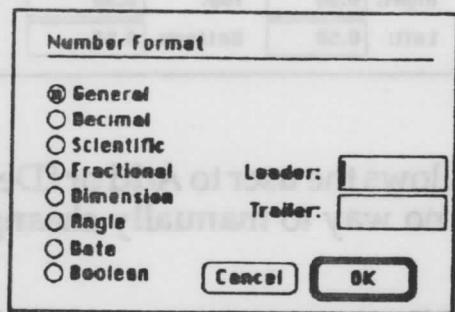
Note: All trigonometry function either give results or take arguments in Radians.

Database Headers

When a row is set to Database, the row itself becomes a header for the subrows. The totals are placed into the database row headers. Deselecting the Headers menu item will cause the row not to display and no totals will appear. But, they may still be referenced.

Number

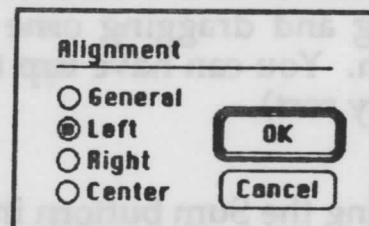
This menu selection allows setting a cell to one of eight number formats. The Date format has a popup with thirteen choices. Boolean format when applied to a conditional cell, one who's result is True or False, will return the specified strings that are substituted for the true and false conditions. Dimension fomat uses the Units set in the file.



When a database row header is selected all the subrows are formatted the same way.

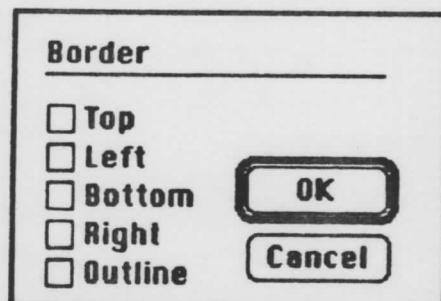
Alignment

Determines how the data in cells is aligned



Border

Allows the user to manipulate the border structure of the worksheet cells.

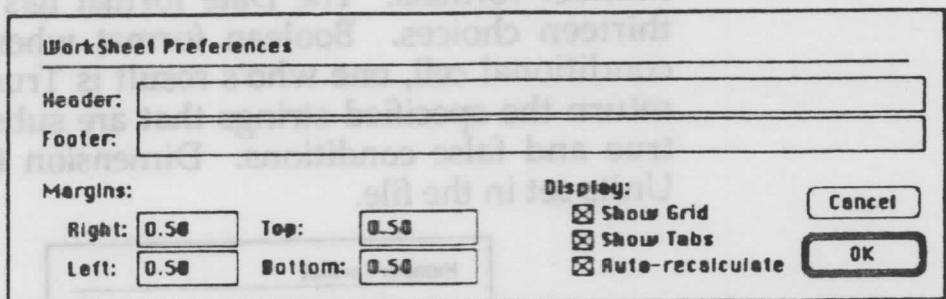


Column Width

Allows the user to set the column width. Any cell selected in a Database row will set the entire column to the same width.

Preferences

The worksheet has its own Preferences menu item which allows setting preferences for each worksheet.



Insert or Delete

Allows the user to Add or Delete columns or rows. There is no way to manually change the number of subrows.

Print

Will print out the open worksheet.



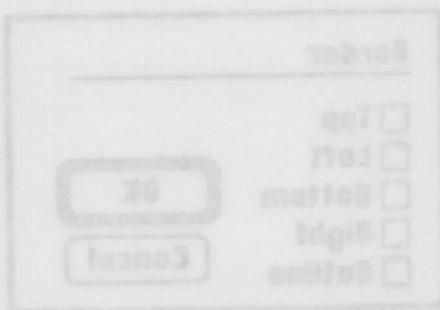
Ascending and Descending order

The columns in the Dataabase rows may be sorted by clicking and dragging one of the Sort icons into the column. You can have up to three columns of sorting (tertiary sort).

Sum



Dragging the Sum button into a header row will cause the program to search and combine all its subrows of equal value.



sin Worksheet

The worksheet can return to the user virtually any information needed about the drawing. When worksheets are created they may be moved from one drawing to another through the Import command in the file menu. Items such as door schedules and material list may be common to many drawings.

Worksheet Cursors

When a worksheet is opened, several new cursor icons appear.

Cell Selection Cursor

This cursor allows the user to identify a cell or range of cells by dragging the cursor over the specified cell or cells.



Column Resize Cursor

When the cursor gets within so many pixels of the lower right corner of the spreadsheet, this cursor will appear. Click the mouse button and drag in order to resize.



Text Cursor

The text cursor appears when the Formula Edit Bar is active.

Worksheet Formulas

The standard set of symbols, characters, or words that can be used in a formula are as follows:

Name Symbol Special key

Plus	+	
Minus	-	
Multiply	*	
Divide	/	
Left bracket	(
Right bracket)	
Comma	,	
Semicolon	;	
Colon	:	
Square Root	√	Option v
Summation (Sum)	Σ	Option w
Pi	π	Option p
Not Equal (< >)	≠	Option =
Less than or equal to (< =)	≤	Option <
Greater than or equal to (> =)	≥	Option >

Less than	<
Greater than	>
Delta	Δ
"Euler's Constant"	e
True or Not False	
False or Not True	
Power (**)	^
	Option i

Search Criteria

Using the Search Criteria dialog box to place criteria into a cell is easier than trying to memorize all the criteria. When you select the button equivalent for the items below, the dialog box that appears lists all the possibilities in the file for that attribute.

Attribute Specification

Object Name	N
Class Name	C
Layer Name	L
Fill Pattern	FP
Line Weight	LW
Line Style	LS
Object Type	T
Symbol Name	S
Selected Status	Sel
Object Record	R
Pen Pattern	PP
Fill Foreground	FF
Fill Background	FB
Pen Foreground	PF
Pen Background	PB
Arrowhead	AR
Visibility	V
Every Object	All

Worksheet Row Menu

Set Criteria

Selecting a Database Row and then this item will bring up the Search Criteria dialog box. Any criteria set will replace the existing criteria in the database row.

Edit Criteria

Selecting this item will place the current Database Row criteria in the Formula Edit Bar where you may edit it.

Select Data Items

This will select all objects in the drawing that met the Search Criteria of that row.

Command...

Command... 

A command is a script that instructs the program to perform a specific task. Menu items such as Join or Fillet are commands. By selecting these menu items the user is commanding the program to perform a task with the objects selected.

MiniCad+ allows the user to create commands that do not already exist within the program. Since the program must have some idea of what the user wants it to do, the user must follow a specific script. That script is MiniPascal.

Most users will not have a knowledge of Pascal and its syntax. Because of this we have created dialogs that the user may employ to tell the program to write the script.

Macros are combinations of commands in MiniPascal. For example, a macro may be set to Select All, Copy, and Paste on Next Mouse Click. A macro or series of macros may be placed into a command with the command editor dialog box.

Commands are placed in a Command palette. The program will create a palette for menu items (such as Save View) that create commands if no command palettes exist in the drawing.

The user creates a palette and gives it a name. Then, the user creates commands and places them on a palette. The palette may be left on the drawing or closed and brought back on the screen when it is time to use the commands in it.

The Command menu item brings up the Command dialog box which controls Command palettes and Commands made with:

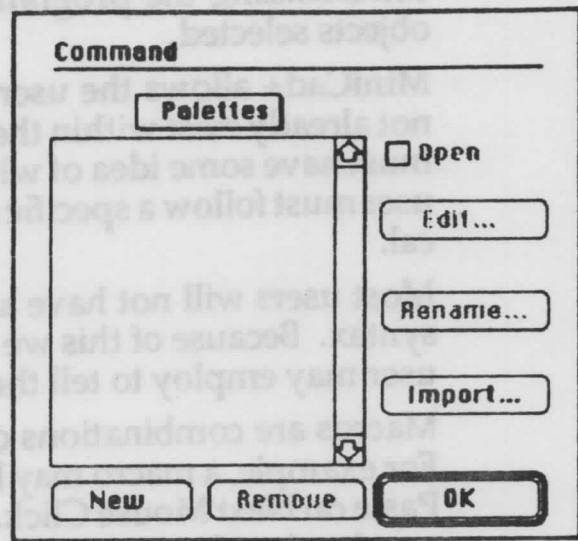
- Save View
- Command...
- Custom Selection
- Custom Tool / Attribute
- Custom Visibility

The Command dialog box works on two levels:

- Palettes
- Commands

Command Palettes List

The names of all command palettes are placed into the Palette List. Any palette listed may be Edited to work on a specific command.



Open with Palette List

To place a Command Palette on the screen so its commands are accessible from the drawing window, select the palette in the Palette List then click the Open button.

Edit with Palette List

When the Command dialog box displays the Palette List, clicking the Edit button will bring up the Command List and display the names of the Commands in the selected palette.

Rename with Palette List

When the Command dialog box displays the Palette List, clicking the Rename button will bring up a dialog box to change the name of the selected palette.

Import with Palette List

When the Command dialog box displays the Palette List, clicking the Import button will bring up a dialog box to search for the palette you want to Import.

Remove with Palette List

Clicking the Remove button with a palette selected in the Palette List will delete that palette from the file and all of its commands.

New with Palette list

Click the New button and a dialog appears asking for you to name the new palette. After typing in a name for the palette, a dialog box will appear asking for you to type in a name for a new command to place on the palette.

OK with Palette List

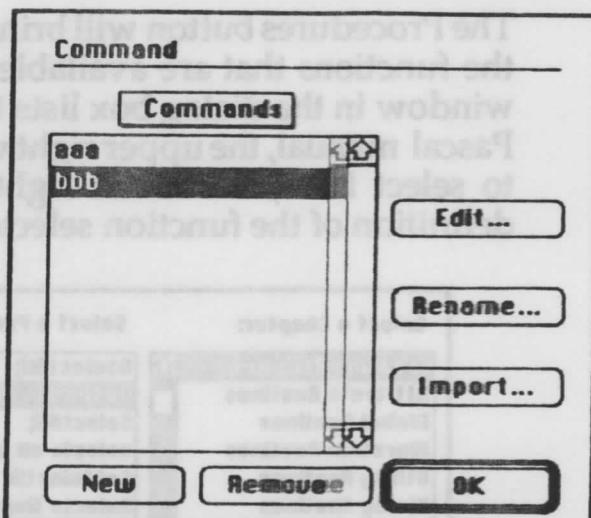
Clicking this button when the Palette List is displayed in the Command dialog box will return you to the drawing window.

Command List

When a palette in the Palette List is selected and the Edit button is clicked a list of the commands in that palette appears in the Command dialog box.

Rename with Commands List

A dialog will appear in which you may rename the



selected Command in the Commands List.

Import... with Commands List

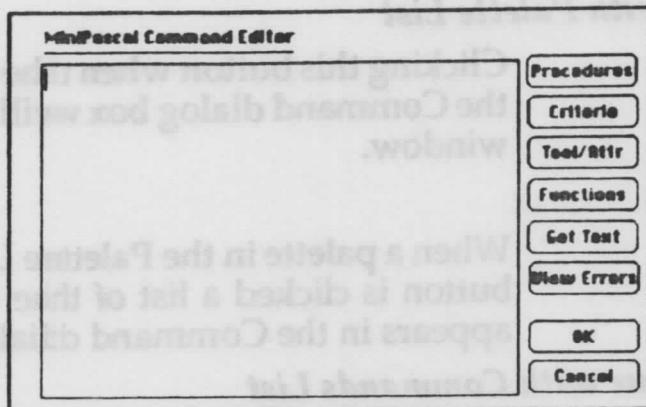
A search dialog box appears from which you may search for and select the command you want to import into the palette currently being edited.

Remove with Commands List

Will delete the command from the palette being edited.

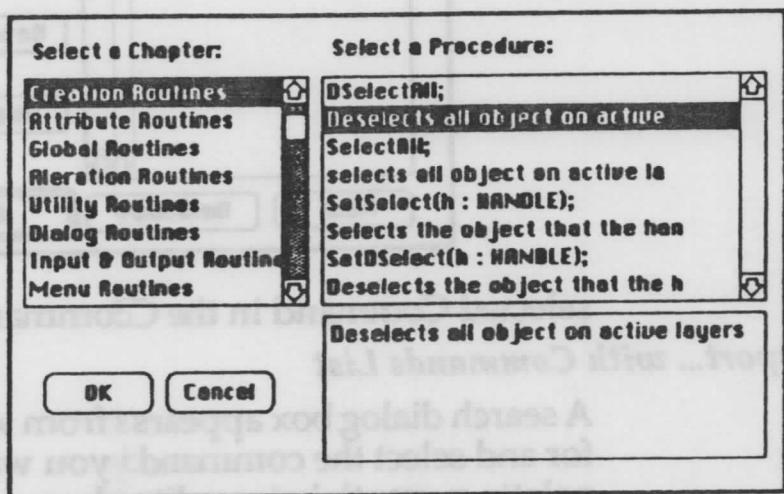
Edit or New with Commands List

Clicking either of these two buttons will bring up the MiniPascal Command Editor dialog box. The difference is that when editing a command, any existing command script will be listed in the Edit window.



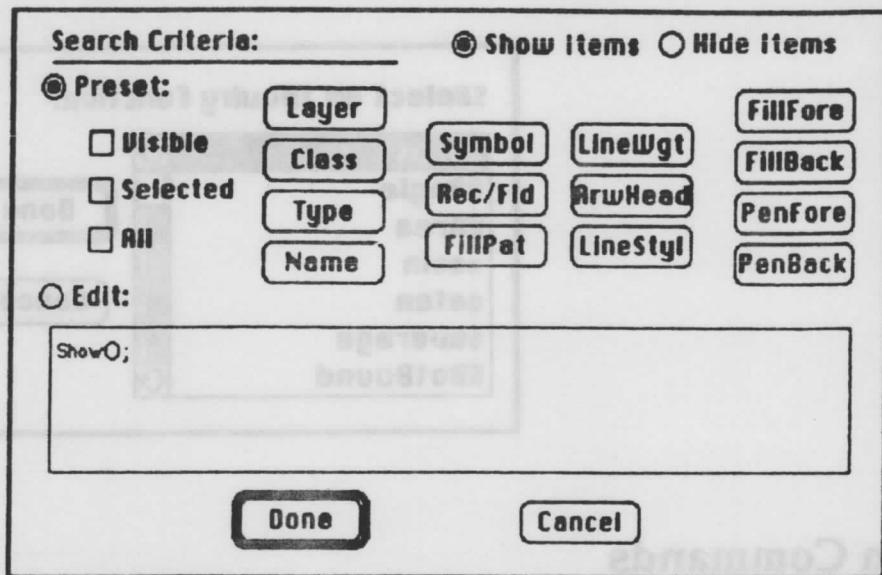
Procedures

The Procedures button will bring up a dialog that lists all the functions that are available in MiniPascal. The left window in the dialog box lists the chapters of the Mini-Pascal manual, the upper right window list the functions to select from, the lower right window gives a short definition of the function selected.



Criteria

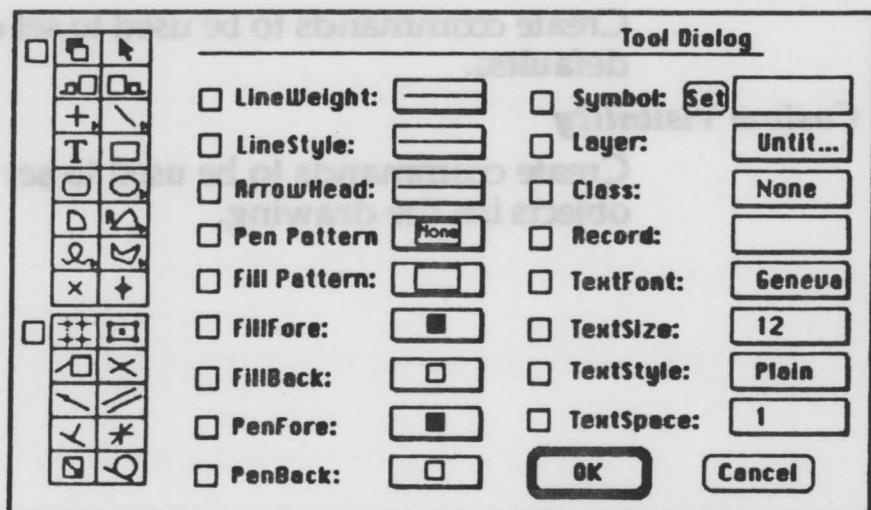
Clicking this button allows you to select search criteria to be placed into the command. The buttons will bring up a dialog from which to choose criteria in each classifica-



tion. The criteria is placed into the Edit window thus allowing it to be edited here as well as in the MiniPascal Command Editor. This is the same dialog that is used with the Worksheet: Database Row.

Tool / Attribute

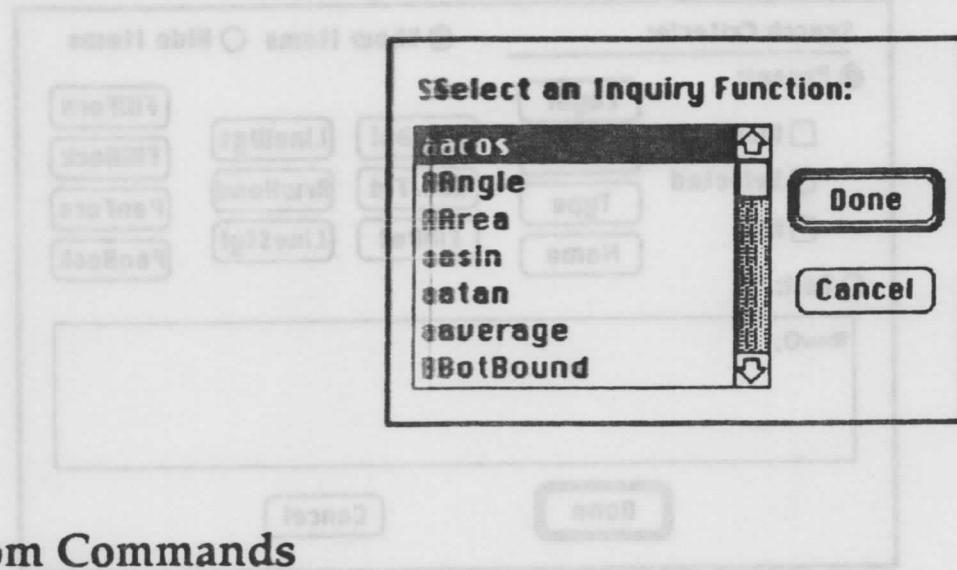
A command may be set for the usage of a specific tool. For example, a command named File Cabinets could be set to



bring up a rectangle tool with certain snaps, to be drawn on a particular layer, assigned a class and records, fill patterns, etc.

Functions

Commands may also include mathematical functions. Select the function then click Done. The Function will be placed into the MiniPascal Command Editor.



Custom Commands

The last three menu items in the Command menu are custom commands. They allow the user to quickly create small routines and create a command palette for the routines (commands) if none are open.

Custom Selection

Create commands to be used to select objects in the drawing.

Custom Tool / Attribute

Create commands to be used to set drawing modes and defaults.

Custom Visibility

Create commands to be used to set visibility of specific objects in the drawing.

Print

- 15.1 Introduction
- 15.2 Page Configuration
- 15.3 Print Sequence
- 15.4 Using The Chooser
- 15.4 Printer Resolution
- 15.5 ImageWriter
- 15.7 LaserWriter
- 15.9 LQ Printer
- 15.11 Plotters

Introduction

The flexibility inherent in this program's coordinate and scaling system and the fact that the user is not locked to a 'sheet' while creating a drawing, means the user doesn't have to be concerned with issues of sheet size, drawing scale, and/or output devices until ready to print. However, we suggest that the above be done prior to creating a document.

In this documentation, Print Area is defined as the drawing area resulting from the page type and orientation selections made in the Page Setup dialog box. The print area is always shown with a gray border as the first object drawn on the screen. It is the print area that fits to the screen when the Fit to Window command is selected from the Page menu.

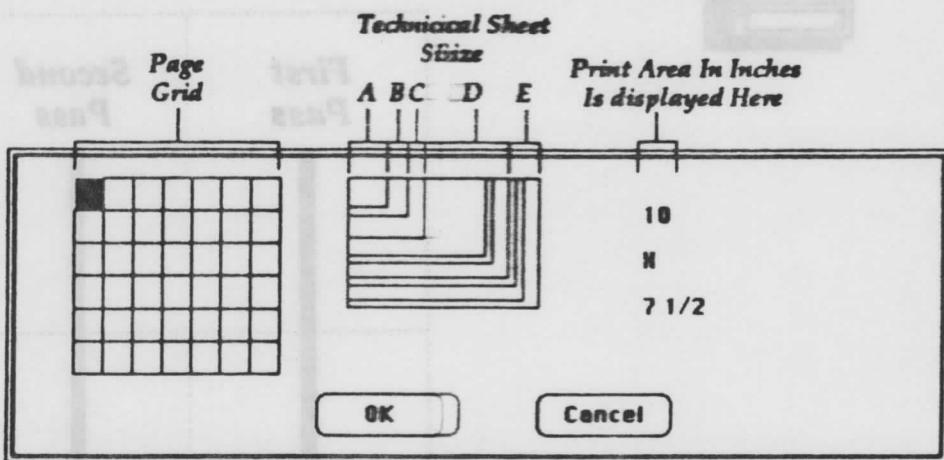
The sheet size, print area, and orientation of printout determine which printing or plotter driver is selected in the Chooser. This program looks to the driver to determine all parameters for printing except the number of pages. Multiple pages are selected from Drawing Size in the Page menu. In the Drawing Size dialog box one tile of the forty-two tiles is the default. This means that one sheet of paper will print with the configuration set up in Page Setup. If you select more than one of the tiles in Drawing Size, then one page for each tile will be represented on the screen with the configuration of each page being set in Page Setup.

There is an overlay section in the Drawing Size dialog box which will set up a drawing for technical size sheets. These overlays do not receive any information from the driver selected in the Chooser. Trying to print with one of these overlays selected will not give the expected result. The overlays are there for the following two reasons:

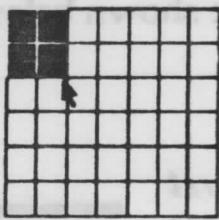
- Individuals who do not have a plotter driver may wish to set up their drawing to the proper size before sending it out to be plotted.
- Individuals who use plotting applications that may not be accessed from the Chooser may need to export the file to another format for plotting.

Page Configuration

All printer or plotter drivers that reside in the System folder use the Page Grid below that has forty-two (42) squares. This program will look to the selected driver and set the Page Setup to each of the tiles selected.



The Technical Sheet Overlays are only for use when there is no driver available in the Chooser for the type of printout wanted.



This will give four sheets of printout.

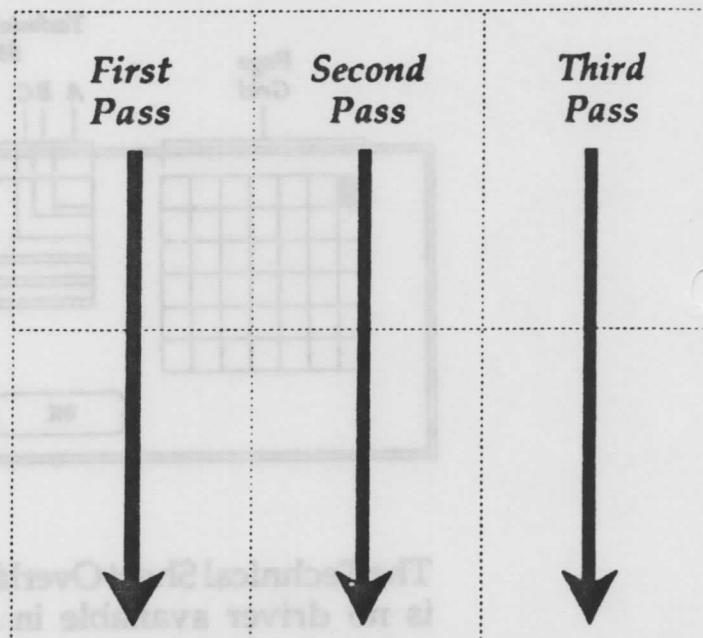
After selecting a driver in the Chooser and paper size in Page Setup, the 'print area' available is indicated as above. This 'print area' is the grayed border that fits to the screen when 'Fit to Window' is selected under the Page menu. If more than one page is needed, then clicking in the grid area will select the amount wanted for the printing configuration.

ImageWriter and ILQ Printing of Large Format Sheets

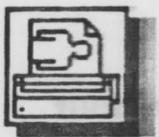
*Tall Page Orientation,
No page breaks:*



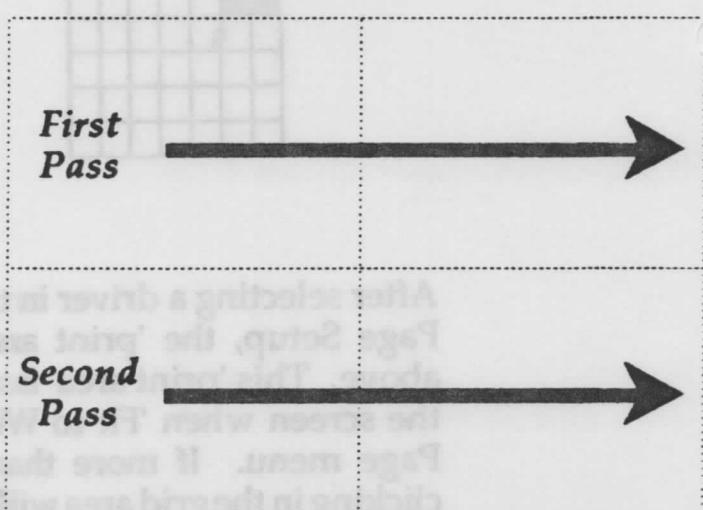
This program prints the multiple page sheet on the ImageWriter as a series of continuous vertical strips, as in the example shown below:



*Wide Page
Orientation,
No page breaks:*



This program prints the multiple page sheet on the ImageWriter as a series of continuous horizontal strips, as in the example shown below:



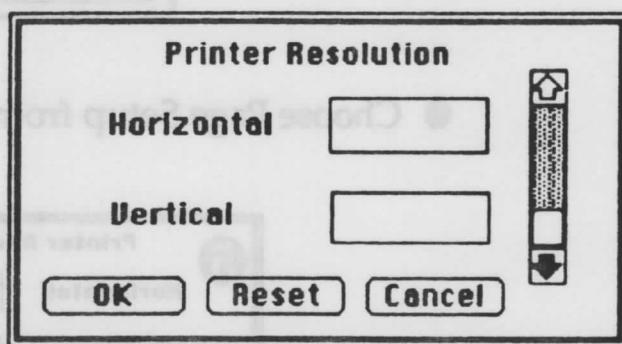
Using the Chooser



This System folder has a variety of five printer drivers and two plotter drivers. After selecting a driver from the Chooser, the user should select Page Setup under the File menu. Later in this chapter, Page Setup, Printer / Plotter Resolution, and Print dialog boxes are fully explained for the ImageWriter, LQ Printer, Laserwriter, and Plotters under their corresponding titles.

Printer Resolution

In this dialog box, the default printing resolution will appear depending on which driver was selected from the Chooser. The resolution may be changed by moving the scroll bar on the left side of the box. The resolution selected will be saved with the document.



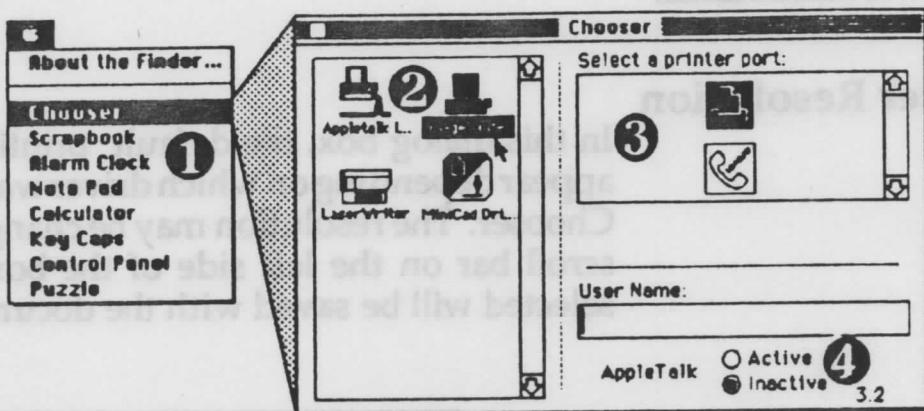
Clicking the OK button, will set the printer resolution.

Clicking the Reset button will change the resolution back to the driver default.

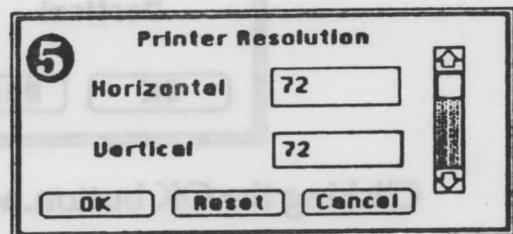
Clicking the Normal button will send the file through the low resolution 72dpi port. This should only be done to access the ImageWriter reduction box.

Printing on the ImageWriter

- ① Select the Chooser from the Apple menu.
- ② Choose the ImageWriter Driver.
- ③ Choose the output port to which your ImageWriter cable is connected. In most cases it will be your printer port.
- ④ Specify whether AppleTalk is active or not. The ImageWriter driver is now selected as the system print driver and now controls the Page Setup and Print dialogue boxes.

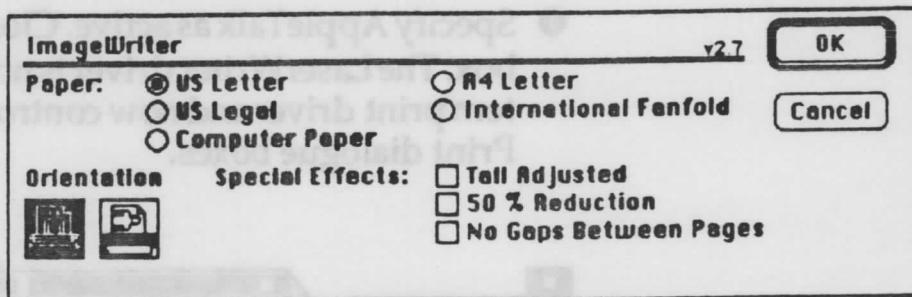


- ⑤ Choose Page Setup from the File menu.

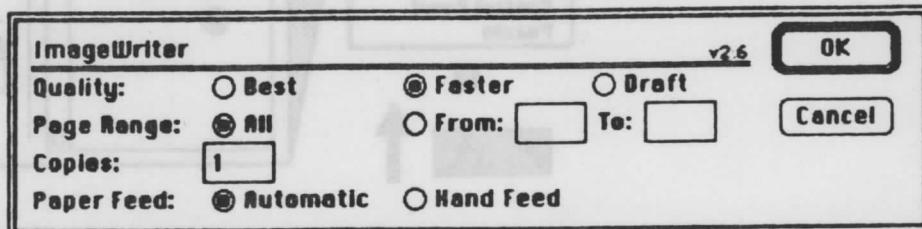


This is the normal default for printing resolution of the ImageWriter printer. This default may be changed by moving the scroll bar. Clicking OK will bring up another dialog box. The Reset button will move the resolution setting back to the default.

This dialog box appears when selecting OK in the Resolution dialog box. Here you select the type of paper that is being printed to and whether printing is being done in Portrait mode (normal default) or Landscape mode. The Special Effects buttons, if not grayed out, may be used to adjust print spacing, reduction of output, and continuous printing from page to page. If using 15" paper, select Computer Paper. Click OK.

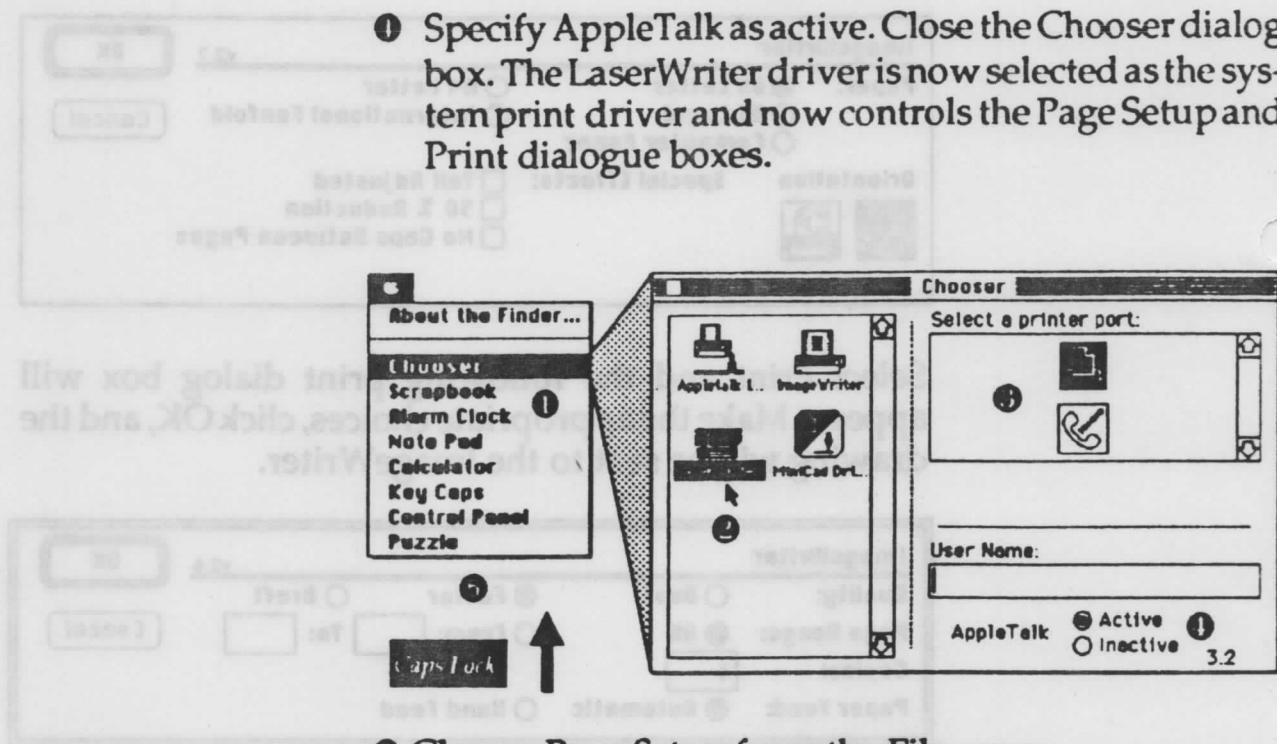


Select Print and the following print dialog box will appear. Make the appropriate choices, click OK, and the drawing will be sent to the ImageWriter.

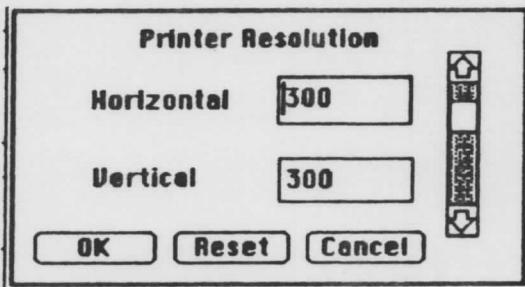


Printing on the LaserWriter

- ① Select the Chooser from the Apple menu.
- ② Choose the LaserWriter Driver.
- ③ Choose the output port to which your LaserWriter cable is connected. In most cases it will be your printer port.
- ④ Specify AppleTalk as active. Close the Chooser dialog box. The LaserWriter driver is now selected as the system print driver and now controls the Page Setup and Print dialogue boxes.

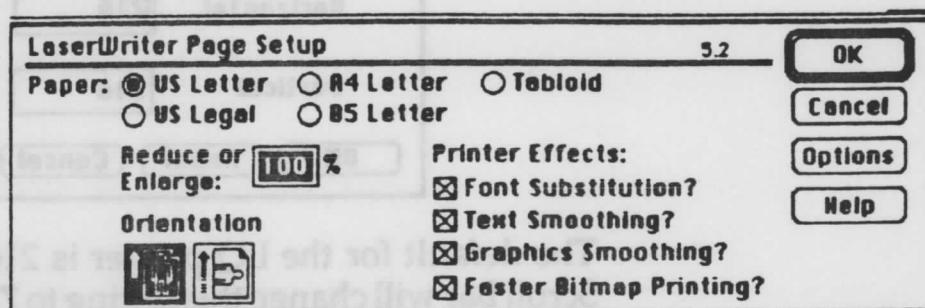


- ⑤ Choose Page Setup from the File menu.

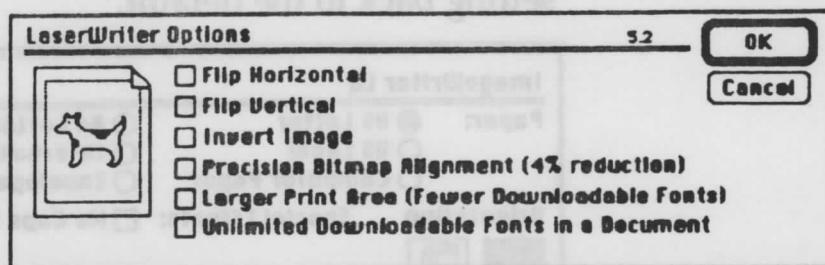


This is the normal default for LaserWriter resolution. Changing the default may be done with the scroll bar. Clicking OK will bring up another dialog box. The Reset button will move the resolution setting back to the default.

This dialog box appears after selecting OK in the Printing resolution box. Here you select the type of paper, reduction or enlargement, portrait or landscape modes, and printer effects depending upon the individual needs of the document.

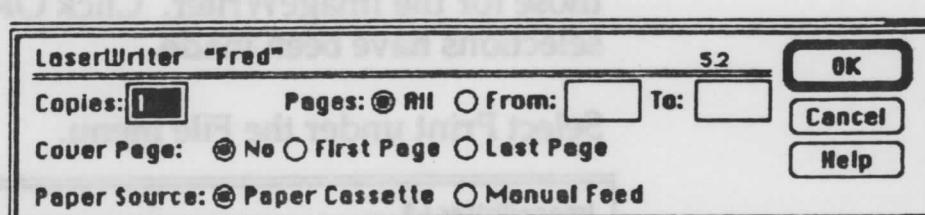


Clicking the Option button, the following box appears.



Clicking the Help button will bring up a Help dialog box.

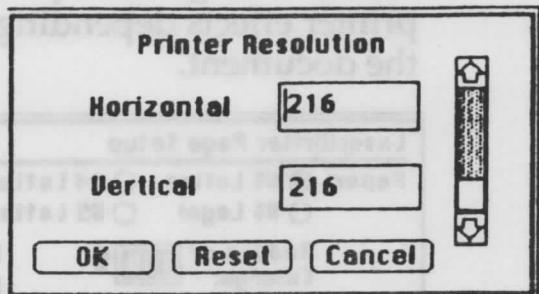
Click OK in the LaserWriter Setup dialog box then select Print under the File menu.



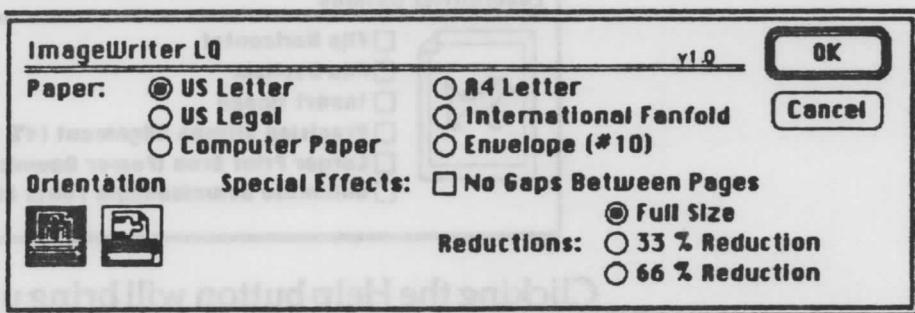
Clicking the OK button in the LaserWriter dialog box will send the file to the printer. A Help file is available for some additional information.

ImageWriter LQ

After selecting the ImageWriter LQ in the Chooser under the Apple menu, select Page Setup under the File menu.

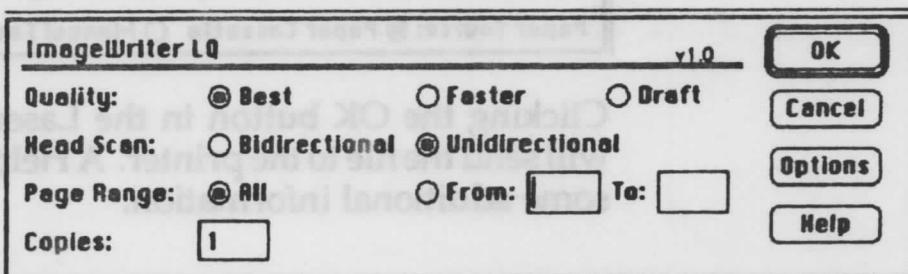


The default for the LQ printer is 216 dpi. Moving the Scroll Bar will change this setting to 72 dpi. These are the only two settings for this printer. Clicking OK will bring up the Setup dialog box. Clicking Reset will change the setting back to the default.



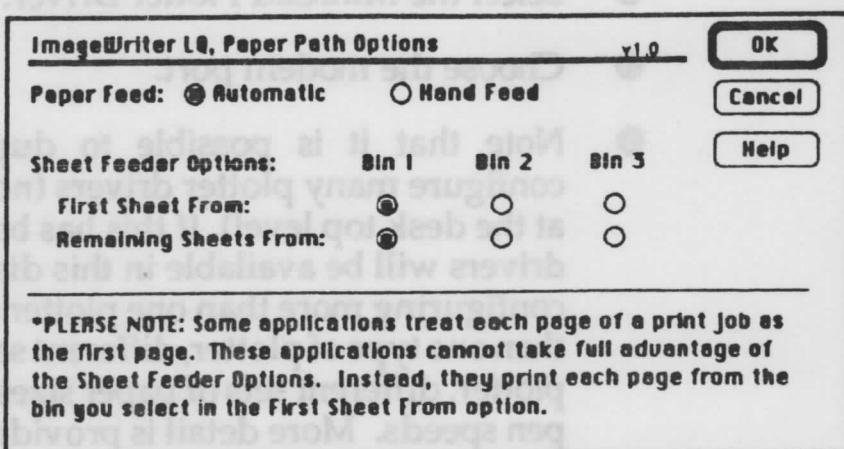
Selections in the Setup dialog box include Paper type, Orientation, and Special Effects which are similar to those for the ImageWriter. Click OK after appropriate selections have been made.

Select Print under the File menu.



The Print dialog box requests from the user the following selections: Quality, Head Scan, Page Range, and Copies. Select quality as per type of document needed. Selecting bidirectional will print much faster but unidirectional does the best job especially for precise registration. Page Range and Copies are self explanatory.

Clicking the Options button will bring up the following dialog box. It is suggested that you thoroughly read the LQ manual before using multiple options.



Using MiniCad Plotter Driver

- ① Select Chooser from the Apple menu.
 - ② Select the MiniCad Plotter Driver.
 - ③ Choose the modem port.
 - ④ Note that it is possible to duplicate, rename and configure many plotter drivers (not in this window but at the desk top level). If this has been done, then all the drivers will be available in this dialog box. Reasons for configuring more than one plotter driver include: more than one type of plotter, different sets of pens in the same plotter, different sets of paper sizes, and different sets of pen speeds. More detail is provided on this topic in the manual for the MiniCad Plotter Driver. The MiniCad Plotter driver is now selected as the system print driver and now controls the Page Setup and Print.
 - ⑤ Select Print from the File menu.
 - ⑥ If a Page Setup had not been done previously, the Print Resolution box should appear.
 - ⑦ The Plotter Page Setup dialog box will appear. Make the appropriate choices and click OK.
 - ⑧ The Print dialog box will appear. Make the appropriate choices and click on the OK button.

MiniCad Plotter Drivers

With the MiniCad Plotter drivers, you may plot directly from this program or create a Print File to be plotted later with the MiniCad Plot application. Please read the plotter driver manual thoroughly, especially if using a driver other than the MiniCad Plotter driver. The following is a listing of plotters and models that currently may be accessed by the MiniCad Plotter driver.

Plotters Supported by MiniCad Plot

Advance Bryans 6210	Graphtec MP2000	H. I. DMP 51/51MP
Advance Bryans 6310	Graphtec MP3100/200/300	H. I. DMP 52/52MP
Advance Bryans 6320	Graphtec MS8603	H. I. DMP 55
Apple Plotter	Hewlett Packard 7220	H. I. DMP 56/56MP
Benson 1062	Hewlett Packard 7440	H. I. E595DN
Calcomp 81	Hewlett Packard 7470	H. I. E795DN
Calcomp 1023	Hewlett Packard 7475	H. I. PC595A
Calcomp 1041/2/3/4	Hewlett Packard 7550	H. I. PC695A
Calcomp 1073/5/6/7	Hewlett Packard 7570	Numonics 5860
Calcomp 945A/65A	Hewlett Packard 7580	Roland 880
Epson H180	Hewlett Packard 7585	Roland 885
Facit 4551	Hewlett Packard 7586	Roland 980
Graphtec FD5211	Hewlett Packard 7595	Roland 990
Graphtec FP5301	Hewlett Packard 7596	Roland 1100
Graphtec GP9001	Hitachi 672	Roland 2200
Graphtec GP9101	H. I. DMP 29	Roland 3300
Graphtec PD9011	H. I. DMP 40	Zeta 8
Graphtec PD9111	H. I. DMP 41	Zeta 824
Graphtec MP1000	H. I. DMP 42	Zeta 836

Plotters not listed here but which emulate any of the above, such as the Zericon or Fujitsu plotters also work well with the MiniCad Plotter drivers.

Glossary

Glossary

A

Absolute Views	Six preset views in 3D.
Active	Any object(s) or mode(s) currently in use.
Active Layer	Only one layer may be active at a time. The active layer is the layer that is currently selected in the layers listing.
Add Surface	To add the surface area of one object to another.
Align to Grid	When this feature is on the object will snap to the grid when it comes within (n) pixels of the grid.
Align H - Align V	Interactive data showing horizontal or vertical alignment from snap points.
Align Objects	Setting position of objects comparable to others.
Alignment	Adjustment of an object's position on the screen to match another object.
Angular Dimension	Allows user to create an angular dimension from a selected line or between two selected lines.
Arc Sweep	Total angle of arc.
Arc Tools	Quarter Arc or Full Arc drawing tools available from the Tools Palette.
Aspect Ratios	Ratio of height to width displayed in Data Bar at bottom of screen.
Assign Class	Process of tying an object to a specific class name. Done through Data Palette.
Assign Record	Process of tying a record to an object. Done through Data Palette.
Attach	Command in Symbol Library that allows attaching records to symbols.
Attributes	Any and all data that is used in the creation of object or text in this program.
Auto-Dimensioning	Program dimensions objects through menu commands.

B

Bezier Spline	Curved polygon whose curvature is between the vertices.
Bitmap	A matrix of 72 dpi pixels (MacPaint type image). May only be resized or rotated in this program.
Border	The lines, either straight, curved, or a combination thereof, forming the edge of a filled object.
Border (Worksheet)	The lines that comprise the edges that describe cells or cell grouping within a spreadsheet.
Bounding Box	Also called Boundary. An invisible rectangle that exactly encloses the entire graphic object or group. When the object or group is selected, polyhandles appear at the corners and midpoints of the sides of this rectangle.
B & W Only	Sets color to black and white.

C

CAD	Computer Aided Design.
Cartesian	Usage of X and Y coordinates in drawing.
Centroid	Center of rotation.
Chain Dimensioning	Horizontal or vertical dimensioning of multiple vertices.
Chooser	A Desk Accessory supplied by Apple with the System which is employed for the selection of a printing or networking device.
Circle Tools	Circle or Oval drawing tools available from the Tools Palette.
Class Assignment	Places object into category of class.
Class List	Listing of class names from which assignment can be made.
Classes	Catagories of objects.
Clear	Removes the selected object from the screen and does not store it in any buffer memory, essentially wiping it out of existence.

Click	To position the cursor on a screen object and then press and quickly release the mouse button.
Click-click Drawing	Mode of drawing that allows user to click at each vertex of an object while drawing without the necessity of keeping the mouse button depressed.
Click-drag Drawing	Mode of drawing which entails the clicking and holding down of the mouse button while creating an object. This mode may be deactivated in this program, allowing just the clicking of points of an object without the necessity of dragging the mouse with the button held down.
Clip Surface	To subtract the surface area of one object from another where they overlap.
Clipboard	A temporary buffer in which objects or text can be stored after they are copied or cut from the drawing and from which they may be pasted.
Close	Removes the active file from the drawing area. The user will be prompted to Save upon closing.
Column Width	Spreadsheet command allowing setting of a column's width.
Combine Into Surface	Allows creation of a new object (surface) from existing objects.
Comma (Export)	Format which uses commas to separate data.
Command List	List of commands on command palette.
Command Palettes	Floating palettes created by the user to hold Commands.
Commands	User defined routines that may be accessed from palettes.
Constrain Angle	User defined angle added to constraints set in program.
Constrained Line	Constrained line restricts the user to drawing lines at 30°, 45°, 60°, and 90° angles unless additional angles are added in the Preferences dialog box.
Constraint Palette	Palette containing icons that, when activated, place constraints upon drawing tools such as perpendicular, parallel, etc.
Conversion Functions	Menu items allowing the conversion of lines to objects or objects to lines.

Conversion Resolution

Setting in Preferences for line segments per 360° arc.
Used with Conversion Functions.

Convert to Lines

Traces the border of any selected object (except loci or text) and replaces them with lines.

Convert To Mesh

A 3D command allowing conversion of rigid 3D wire frames into editable vertices.

Convert to Polygons

Converts graphic objects (except loci or text) into equivalent polygons. Circles and arcs are approximated by many small straight lines dependent upon Conversion Resolution.

Convert to 3D

Converts 2D planes in 2D space into 2D planes in 3D space.

Coordinate Display

Positional and dimensional data about the object being drawn, moved, or reshaped which is displayed in Data Display Bar at the bottom of the drawing window.

Copy

Menu item which copies objects or text and places the data in the Clipboard buffer for future use.

Create Format

Dialog box that controls formatting of records

Criteria

Attributes used to search for specific objects.

Crosshatch

Allows the creation of line fills within a specified area.

Cubic Spline

Curved polygon whose curvature goes through the vertices.

Cursor Snap

Control of the cursor while moving or placing objects in a drawing, usually to a degree of accuracy greater than can be visually seen on the screen. Snap is in effect when a snap point is within the cursor's snap radius set in Preferences.

Cursor

Icon indicating current relationship between a point on the screen and mouse. This program uses many different cursors indicating what action is presently taking place.

Custom Selection

Menu item that brings up dialog boxes to assist user in creating commands to select objects.

Custom Tool / Attribute

Menu item that brings up dialog boxes to assist user in creating commands to customize drawing.

Custom Visibility

Menu item that brings up dialog boxes to assist user in creating commands to set visibility of objects.

Cut

Removes an object from the screen and stores it in the Clipboard buffer memory.

D

Data Display Bar Area at bottom of document window which displays current data related to objects.

Data Palette Floating palette that contains Object Names, Classes, and Records.

Database Area of program set aside to keep track of records and fields.

Database Headers Main row/column number set to Database row which return accumulative results of subrows.

Database Row Row in worksheet linked directly to objects in drawing through search criteria.

Datum Coordinate of snap location placed into memory which may be altered through data display bar.

Default Condition preset in the program which may be changed by the user.

Default Class Class into which all objects drawn are placed.

Default Value Value of fields when records are assigned to objects.

Desktop Disk or Hard Drive directory.

Diagonal Dimension Dimension between any two points that are not on a 90° angle.

Dialog Box A pop-up window allowing interaction with the program in the form of data boxes, buttons, and checkboxes.

DIF Type of format for import and export of database.

Dimension Accuracy Unit set as display Accuracy controls Dimension Accuracy.

Dimension H	Automatic horizontal dimensioning of points, vertices, objects, groups or multiple objects.
Dimension Lines	Lines running parallel to dimension vertices which may include text defining the distance.
Dimension Markers	Markers appearing at the ends of dimension lines which may be given a variety of assignments (arrow heads, bullets, slash and double slash markers).
Dimension Offset	Setting in Preferences which determines the distance dimension text will offset from the dimension lines.
Dimension Text	Numerical display indicating the length of dimension lines.
Dimension V	Automatic vertical dimensioning of points, vertices, objects, groups or multiple objects.
Display Accuracy	Smallest measurement of unit set for display in Data Display Bar and Dimensions.
Double Line	Creation of two parallel lines at the same time.
Double-Line Separation	Distance of offset for creating double lines set in Set Grid dialog box.
Double-click	To position the cursor on a screen object and then press and release the mouse button twice in rapid succession without moving the mouse.
Drawing Area	That part of the document window in which drawings are actually constructed.
Drawing List	Sequential order of objects in document.
Drawing Size	Dialog box used to set total amount of pages in drawing.
Duplicate	Cloning an object.
Duplicate Array	Multiple duplication of objects through a dialog box.
DXF	Text formatted file used to transfer data between programs.

E	
Edit	Change one or more attributes of any object or text.
Editable Fill Pattern	Starting with the 7th row down under the Fill menu, the user may edit the bit pattern of the fill.
Edit Criteria	Menu Item that places Database Row criteria into Formula Edit Bar where it may be edited.
Edit Format	Dialog box that controls editing of record formats.
Encapsulated	
Postscript	Postscript file export that carries with it a PICT representation of the drawing.
Enter Group	Ability to enter and edit grouped objects, symbols, or the 2D primitives of 3D objects outside the active drawing.
Entry Point	Points entered with the cursor or data box which determine the size and/or the position of an object.
Extrude	Gives Depth to 2D objects, creating 3D objects.
Exit Group	Exits the editing done in Enter Group and returns the user to the active drawing.
Export	Saves a document in a format other than the program's native format.
F	
Field	Subsets of records that contain values.
Field List	Listing of names of fields found in Create Format and Edit Format dialog boxes. Also found in Data Palette.
Field Types	Values in fields may be text strings, integers, numbers with decimals or fractions, and boolean expressions.
Fill Pattern	The dot pattern selected from the Fill menu which fills any graphic objects or text.
Fillet	Places an arc at the intersections of certain objects.
Fit To Window	Resizes the drawing page to fit the monitor.
Flip Horizontal or Vertical	A 180° mirror of objects along a horizontal or vertical plane.

Floating Datum	Preference option setting Datum snap point as cartesian coordinate from which offsets may be made in Data display Bar.
Floating Palettes	Palettes which may be moved around the monitor, turned off so as not to be seen, and turned back on.
Font	Typeface selectable through the System.
Format	The form that a record takes.
Formula Edit Bar	Data bar in a worksheet where text and formulas are entered to be placed into cells.
Freehand Tool	Palette tools used to create polygons in a free form.
G	
Group	A collection of objects that act as one.
H	
Hatch	Allows the creation of line fills in any selected area.
Highlight	Any selection of icons or data boxes which inverts their normal display on the screen. Commonly used in place of the word, Select.
I	
I-Beam Cursor	Activated for the placement of text.
Icon	Graphic representation used in programs to activate modes of operation.
Import	Bring data into the program that is of formats other than MiniCad's native format.
Insertion point	Cursor point around which an object draws during placement.

Intersect Surface	Creation of a new surface where two objects overlap.
Intersect	Places loci along a selected object where it intersects other objects.
Invert	To simulate a photo negative.

J

Join	This command fixes intersections of double lines to create corners, tees, or crosses.
-------------	---

K

Keyboard Entry	Input of data through keyboard for creation of objects.
Key Equivalent	Keyboard equivalent for selection of icons in Drawing or Constraint palettes.

L

Layers	The ability to separate different facets of a drawing while keeping them in the same drawing window. They may be made invisible or grayed-out. The total number of layers in a drawing is restricted only by available RAM.
---------------	---

Layer Options	Popup menu that determines how other layers are referenced from active layer.
----------------------	---

Leader lines	Lines with arrows for pointing to or from data explaining graphic specifics.
---------------------	--

Link Text to Record	Menu item that assists users to link text within a symbol to specific fields of records.
----------------------------	--

Lock	Prevents an object from being moved, cleared, edited, rotated, or cut from the drawing.
-------------	---

Locus	Graphically represented points that have no dimension.
--------------	--

Macros	User defined subroutines created in MiniPascal language.
Marker Configuration	
Marker Size	Point size of dimension line markers.
Marker Style	Types of dimension markers available in the program.
Marquee	Blinking dotted box created with Selection cursor to select multiple objects.
Menu Bar	Area of program window from which menus may be selected.
Minimum Display Unit	
Mirror	Command allowing the reflected opposite of objects at any angle.
Move	Command allowing precise relocation of objects.
Multiple Extrude	Creates a continuous extrusion of selected objects.
N	
Name Object	Ability to give any graphic a name to differentiate it from all other objects.
Normal Scale	Displays objects on the screen the same size as they would print.
Number	Menu item used to set format of numerical display in cells of spreadsheets within this program.

O

Object Name Bar	Top section of Data Palette used to Enter, Display, and Edit names of objects.
Object Point	The points on a graphic object (usually located at the corners, endpoints, midpoints, and / or center of its bounding box) which will cause a cursor to snap to the object.
Offset Duplications	Selection by which duplication may be offset or placed on top of original.
Option	Normally refers to using the Option key to give the user optional choices during selection of tools and menu commands.
Origin	Point at which Cartesian coordinates, 0X and 0Y, meet.

P

Palette List	Listing of all Command palettes in a document accessible from Command dialog box.
Palette Tools	The vertical column of icons down the left side of the MiniCad+3.0 desktop. Each icon in the palette represents a tool, which is activated by clicking on the icon.
Pan	This icon produces a hand cursor that allows the user to move the drawing to a better vantage point.
Paper Scale	The relationship, expressed as a ratio, of the size of the object as printed out to the actual size (world scale) of the object.
Paste	Recalls and pastes an object from the Clipboard buffer memory.
Paste in Place	Menu option allowing perfect registration when pasting from layer to layer or file to file.
Perspective	Rendered view of 3D objects.
Pitch	Distance moved along axis every 360° of sweep.
Pixel	An acronym for Picture element. The dots which make up the display on a graphics computer screen. Each dot is one pixel.

Polar	Use of angle and distance instead of cartesian coordinates.
Popout - Popup	Section in dialog box, menu item, or palette that brings up menu with additional choices to original selection.
Polyhandles	Also called reshaping handles. Four pixel squares that appear at the corners and midpoints of the sides of an object's bounding box (or endpoints in the case of lines or full arcs) when that object is selected.
Preferences	Menu item that allows the user to establish defaults for the file before starting the drawing.
Primitive	A basic graphic object.
Procedures	Preset MiniPascal routines allowing the user to create macros that search internal code of documents.
Proportional	Maintaining ratio of height to width.
Proximity Detection	Program checking distance from objects to allow specific snaps.

Q

Quit The Quit command found under the File menu closes all opened files and the MiniCad+ application.

R

Record	Text information placed into program to be assigned to objects.
Record Format	Menu item that opens the Record Setup dialog box.
Record List	Listing of all available records in file found in the Data Palette
Record Assignment	The attaching of records to graphic objects done through the Data Palette.
Reference Grid	Grid composed of gray crossed lines which the user may set to any size and may be turned off or printed.
Render	Converts 3D objects into sorted 2D polygons or lines.

Reshape	To stretch, shrink, or change the proportions of an object by dragging one of its handles or using dialog box.
Revert	Restore the open active file to its last save.
Rotate	Command allowing rotation of objects dependent upon accuracy settings.
Rotated Text	Text rotated to any integer degree.
Rounded Rectangle	Rectangle with rounded corners that may be proportional or symmetrical to the rectangle.
 S	
Save	Updates file to selected volume.
Save as	Rewrites file to selected volume.
Save View	Stores any view of the drawing at any zoom factor by name in the file for later recall.
Scale	Ratio of drawing size to world size.
Scale Object	Changes size of objects proportionally.
Screen Hints	Preference option allowing Smart cursor to place interactive data describing snap points on screen.
Scroll Bar	Bar with arrows that allows the traversing of lists. The scroll bar arrows are activated when the bar is grayed.
Select All	Allows selection of all objects on the active drawing layer both in and out of the visible screen area.
Select Data Items	Menu item that selects all objects in drawing that matched the Search Criteria of Database Row.
Selection Pointer	Arrow cursor used for mouse selection of menus, palettes, and objects.
Send	Moves objects up and down the sequential drawing list. Options are Front, Back, Forward, and Backward.
Set Criteria	Menu item that allows changing criteria in a Database Row of the Worksheet.
Set Grid	Dialog box allowing setting of Snap Grid, Reference Grid, and Double Line separation.
Set Layers	Dialog box allowing individual layer settings.

Set Perspective	Allows user to define 3 point perspective of rendering.
Set Origin	Allows moving the $0x, 0y$ coordinate point of drawing anywhere on or off the drawing page.
Set Thickness	Menu item that allows the user to type a weight for all object lines.
Shading	Using a light source to shade renderings in 3D.
Shift Drawing	Allows shifting of the entire the drawing with all its layers to any location on or off the drawing page.
Smart Cursor	Program changes cursor icons, draws vectors, and writes data on screen to assist user.
Smoothing	Converts Polygons to and from Bezier or Cubic Splines.
Snap Dot	Small dot that appears at the bottom right of the cursor to inform the user that the cursor is snapped to a point.
Snap-Drag	Ability to grab an object by a specific point and snap the object by that point to one of another object's snapping points.
Snap Grid	The grid to which the user may snap. Grid distance is set in Set Grid dialog box.
Snap Point	The points of objects to which the cursor will snap depending upon the snap constraints set in the Constraint Palette.
Snap Radius	Pixel distance within which the cursor will snap.
Snap To Grid	Ability to snap to a user defined grid.
Snap To Locus	Ability to snap to locus points or horizontal and vertical lines emanating from the locus point.
Snap To Objects	Ability to snap to the polyhandles of an object.
Sort	Placing 2D polygons in sequence as to their distance from a focal point during rendering of 3D objects.
Spreadsheet Row	Row in worksheet assigned to work as spreadsheet only.
Subrows	One subrow is created by the program for each object found in the drawing that matches the search criteria set in the Database Row. Each subrow is linked directly to the object for which it was created.
Sweep	Create a 3D cylindrical object from a 2D object using a centroid.

Swing	Rotate a 3D object 90° left or right.
SYLK (Export)	Format used by several spreadsheet programs to import and export files.
Symbols	Graphic objects placed into a special area of the file database. Insertion of symbols into the drawing will only occupy memory area small enough to carry its name and x,y location.
T	
Tab	Key on keyboard used to move from one edit area to another.
Tablet	A tablet is a peripheral device used in conjunction with a light pen for tracing working drawings directly into the computer using the program's conventions.
Templates	Files saved for opening program with preset defaults, worksheets, databases, or libraries.
Text Format	MiniCad file saved as text that may be opened with any text editor.
Thin Lines	Maintains line thickness as originally drawn when zooming in or out.
Tools Palette	Icon activated drawing tools.
Topple	Rotate 3D object 90° toward top or bottom of screen.
Top Level	Exiting Enter Group by going to the topmost level of groups within a group.
Trim	Ability to cut a line or a series of lines to uniform length.
U	
Unconstrained	May be drawn at any angle.
Undo	Allows undoing the previous action.
Ungroup	Returns grouped objects to their primitive state as individual objects.
Unit	Smallest named unit of measurement from which all calculations are based in the document.
Unlock	Removes the Lock restriction placed on an object so it may once again be edited.

V**Vertex**

A point of intersection of two vectors or a point on a polygon.

View Field

Dialog box that controls field names, types, and default values.

Visibility

Determines how an object is displayed, snapped to, modified, and printed. Visibility may be changed in Layers and Classes dialog boxes and Layer Options popup menu.

Volume

A disk recognized by the system. It may be a hard disk, a partition on a hard disk, or a floppy disk in a diskette drive.

W**Witness Lines**

Perpendicular lines emanating from the endpoints of an object being dimensioned between which the dimension line is drawn.

Worksheet

An interactive graphic object in which text and formulas may be placed which will act on any search criteria based on object attributes.

World Scale:

Actual size of objects.

X**Y****Z****Zoom**

Ability to enlarge or reduce objects on the screen without changing their scale.

Appendix

Appendix 1

MiniCad+ 3.0 Cursors

	Add Vertex		Resize Column Width
	Arrow		Resize Worksheet
	Bullseye		Set Distance
	Caliper		Small Cross
	Compass		Snap Dot
	Pan		Snap Drag
	Move Cursor		Subtract Vertex
	I-Beam		Watch
	Large Cross		
	Multiple Reshape		
	Pick		
	Pointing Hand		
	Resize		

Appendix 2 MiniCad+ Commands

* Key

1	Zoom-In Factor of 2
Option / 1	Zoom-Out Factor of 2
2	Zoom-In Factor of 4
Option / 2	Zoom-Out Factor of 4
3	Normal Scale
4	Fit To Window
7	Snap To Locus
8	Set Grid
9	Set Origin
A	Select All
B	Send to Back
C	Copy
D	Duplicate
Option / D	Duplicate Array
E	Extrude
F	Send to Front
G	Group
H	Dimension Horizontal
Shift / H	Chain Dimension Horizontal
I	Intersect
J	Join
Option / J	Join & Fillet

Appendix 2

MiniCad+ Commands



Key

K	Dimension Vertical
Shift / K	Chain Dimension Vertical
L	Rotate Left 90°
M	Move
N	New
O	Open
P	Print
Q	Quit
R	Reshape
Option / R	Reshape by Dialog
S	Save
T	Trim
U	Ungroup
V	Paste
Option / V	Paste in Place
W	Close
X	Cut
X	Undo

Appendix 2

MiniCad+ Commands while in Layers dialog box

⌘ Key

A	Activate Layer
B	Send Layer to Bottom of Layer List
C	Colors Dialog Box
D	Send Layer Down one level in Layer List
G	Gray Out Layer
I	Make Layer Invisible
N	Create New Layer
R	Remove Layer
S	Scale Dialog Box
T	Send Layer to Top in Layer List
U	Send Layer Up one level in Layer List
Space Bar	Make Layer Normal

Holding down the Command key and typing the first letter of buttons in a dialog box will activate the button.

Appendix 3

MiniCad+ 3.0 Key Equivalents

Key Drawing Tools

Z	Undo
X	Selection Pointer
C	Zoom - In
V	Zoom - Out
1	Constrained Lines
2	Unconstrained Lines
3	Text
4	Rectangle
5	Rounded Rectangle
6	Oval / Circle
7	Quarter Arcs
8	Full Arcs
9	FreeHand / Cubic Spline
0	Polygons
-	Locus
=	Symbol Insertion

Constraint Tools

A	Snap to Grid
D	Snap to Distance
E	Constrain Parallel
F	Constrain Perpendicular
G	Constrain Symmetrical
Q	Snap to Objects
R	Constrain Angle
S	Snap to Surface
T	Constrain Tangent
W	Snap to Intersection

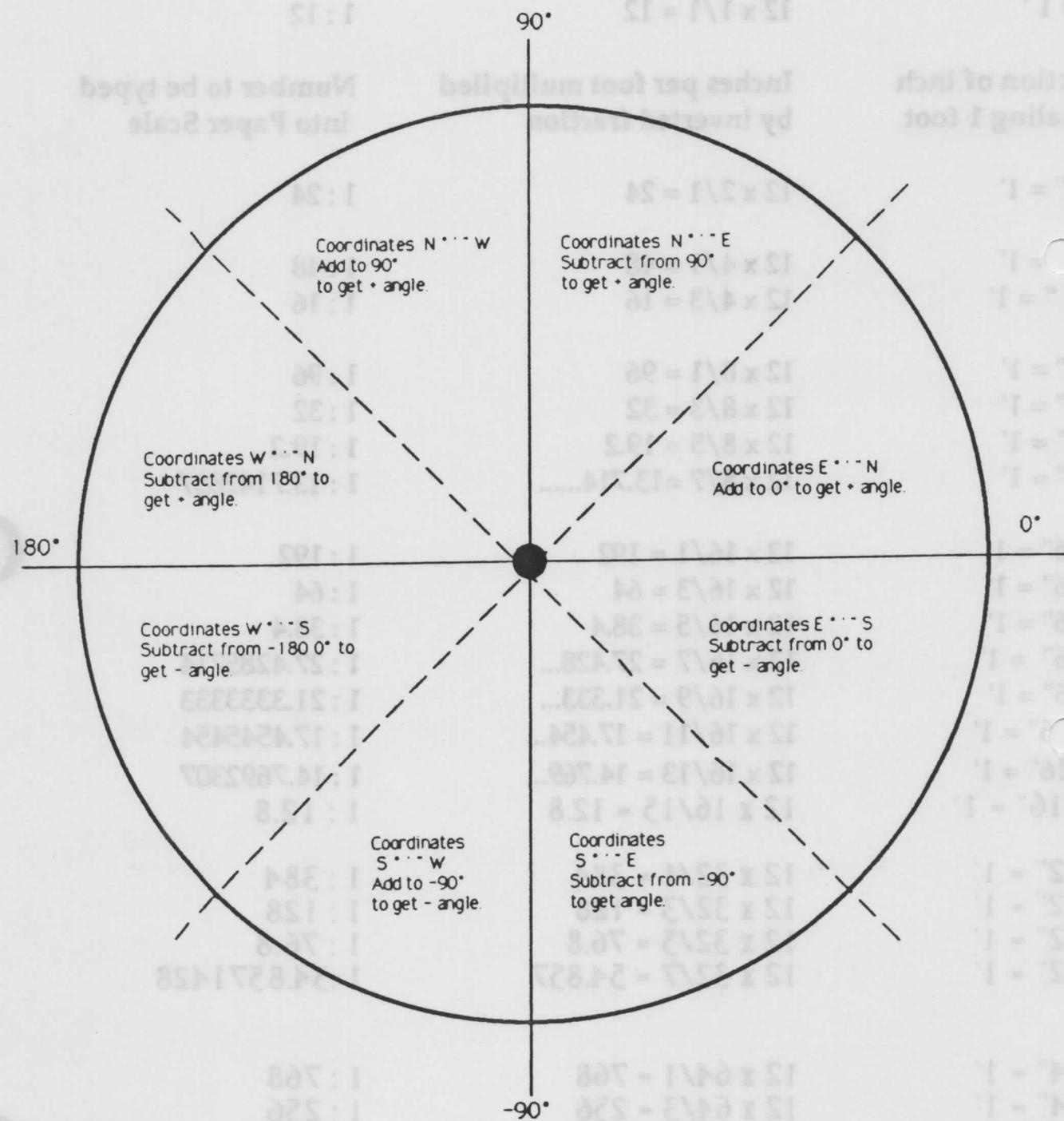
Appendix 3

ARCHITECTURAL SCALE TO MINICAD+ PAPER SCALE

Arch. Scale	Equation	MC+ Paper Scale
1" = 1'	$12 \times 1/1 = 12$	1 : 12
Fraction of inch equaling 1 foot	Inches per foot multiplied by inverted fraction	Number to be typed into Paper Scale
1/2" = 1'	$12 \times 2/1 = 24$	1 : 24
1/4" = 1'	$12 \times 4/1 = 48$	1 : 48
3/4" = 1'	$12 \times 4/3 = 16$	1 : 16
1/8" = 1'	$12 \times 8/1 = 96$	1 : 96
3/8" = 1'	$12 \times 8/3 = 32$	1 : 32
5/8" = 1'	$12 \times 8/5 = 19.2$	1 : 19.2
7/8" = 1'	$12 \times 8/7 = 13.714\dots$	1 : 13.7142857
1/16" = 1'	$12 \times 16/1 = 192$	1 : 192
3/16" = 1'	$12 \times 16/3 = 64$	1 : 64
5/16" = 1'	$12 \times 16/5 = 38.4$	1 : 38.4
7/16" = 1'	$12 \times 16/7 = 27.428\dots$	1 : 27.4285714
9/16" = 1'	$12 \times 16/9 = 21.333\dots$	1 : 21.3333333
11/16" = 1'	$12 \times 16/11 = 17.454\dots$	1 : 17.4545454
13/16" = 1'	$12 \times 16/13 = 14.769\dots$	1 : 14.7692307
15/16" = 1'	$12 \times 16/15 = 12.8$	1 : 12.8
1/32" = 1'	$12 \times 32/1 = 384$	1 : 384
3/32" = 1'	$12 \times 32/3 = 128$	1 : 128
5/32" = 1'	$12 \times 32/5 = 76.8$	1 : 76.8
7/32" = 1'	$12 \times 32/7 = 54.857$	1 : 54.8571428
etc.		
1/64" = 1'	$12 \times 64/1 = 768$	1 : 768
3/64" = 1'	$12 \times 64/3 = 256$	1 : 256
etc.		

Appendix 3

Converting Surveying Degrees to MiniCad+ 3.0 Degrees



Y	Y
Y Moon	= - Moon
Y Moon	Y Moon
Y Moon	Y Moon

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